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REVIEW ARTICLE

LEGISLATION ON THE BURNING OF VEGETATION IN THE BRITISH COLONIES

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IT IS sometimes supposed that the Colonial Office lays a deadening hand on colonial legislation, imposing a uniformity which takes too little account of local circumstances. Nothing could be further from the truth, at least in the sphere of agricultural legislation. Ordinances in the different territories dealing with the same subject show the most irrational divergences and inconsistencies, and it is evident that in many cases they would have been better drawn had the draftsmen been more aware of what was already in force elsewhere. These points are best illustrated in the study of a single concrete branch of the subject, and the legislation on the burning of vegetation gives as good examples as any. It was not until the appearance of the recent series of Natural Resources Ordinances in certain territories that any sign is apparent of uniformity, or of colonies learning from one another.

The first group of ordinances to be considered is concerned chiefly with the prevention of damage to crops and property by fire. Here, it is true, the aggrieved party has general legal remedies against another who has damaged his property by negligence or malice. But so serious is the danger in some colonial territories that they have thought fit to deal with it by specific laws. This is particularly the case in the West Indies, where crops of sugar-cane are easily fired by malice or accident, or sometimes deliberately to burn off the trash before harvest, while the trash itself may also be burned when lying on the field. It is accordingly in these colonies that laws of this class are found, and they are in general the oldest group of colonial ordinances on the subject.

In Barbados, the Cane Fires (Prevention) Act, 1949,* repealed and replaced a similar Act of 1901. It prohibits smoking in cane fields, and makes it an offence for any person to set fire to a cane field except under permit from the Commissioner of Police, who may specify conditions when he issues it. The duty is laid upon occupiers of cane fields of extinguishing any illegal fires as speedily as possible. In British Honduras there are Burning of Vegetation Rules, 1945, under the Fire (Negligent Use of) Ordinance, 1924. No person is to burn vegetation for cultivation unless the area is completely surrounded by a firetrace, equal in width to the height of the vegetation with a minimum width of 6 ft. In Jamaica under the Country Fires Law, 1942, it is an offence to set fire to any crops, except sugar-cane to rid it of vines or pests (the vine referred to is the "love vine"—*Cuscuta* spp.—which under legislation of Grenada and Barbados is declared a noxious weed to be destroyed immediately by occupiers of land). Trash must not be burned without giving adjoining occupiers three days' notice, and a firebreak 15 ft. wide is here insisted on. Trash fires are not to be started at night or left unattended.

Trinidad has the most stringent provisions of all under the Agricultural Fires Ordinance (1915) and an amendment of 1944. Any person wishing to set a fire must (a) clear a firebreak 25 ft. wide round the area ; (b) apply for a licence to the Warden of the ward, enclosing a certificate from a neighbouring landowner that (a) has been carried out ; (c) if a tenant, send the Warden also the permission of the landowner. The Warden then issues a licence specifying the number of persons who must be present to control the fire and the hours during which it may be lit. The licensee finally has to give 48 hours' notice to neighbouring landowners and to the local police station! Under the same ordinance the Governor may prohibit setting fire to land in any area during any period and may appoint a Fire Vigilance Committee for any county.

The other main class of fire legislation is found in the African territories. Here the legislation is of wider scope and in a sense morally higher, since the aim is obviously not only to protect property but

* No guarantee can be given that legislation mentioned in this article is still in force unchanged, though every endeavour has been made to check that this is so unless stated to the contrary in the article. Information compiled from sources published in the colonies can never be completely up to date by the time it is printed.

also to prevent wanton destruction of vegetation and consequent denudation of the soil with bad effects reaching on to posterity.

Sierra Leone was the earliest territory to legislate, at first in a modest way. The Crown Lands Conservancy Ordinance (1903) merely prohibits any person from setting fire to crown land unless licensed to occupy it. This was followed by the Bush Fire Prevention Ordinance (1906). This ordinance makes it an offence to set fire to grass or bush carelessly, when a strong wind is blowing, or without first clearing the ground for a space of 12 ft. round the area to be burned—a great deal to demand of any African population! Power was also given to the Governor to describe by order protective belts within which no bush may be cut. A series of subsequent orders under this clause have specified one belt in the Colony and a large number in the Protectorate along the course of roads and streams, extending usually to 66 ft. but sometimes to 33 or 44 ft. on either side of the road or stream.

It is probably now impossible to know the exact motives of those who drafted the clause about protective belts in 1906. Did they realise at such an early date the danger of erosion which bitter experience has since shown so often to exist along roads and streams? Did they wish to prevent the smoke of grass fires drifting on to roads to the danger of traffic? It seems unlikely when motor-cars were still a rarity; also unlikely that they had the prescience to foresee the clouds of dust raised by lorries which would smother houses built right up to the side of the road. But in any case their foresight remains remarkable for the period.

This is, however, the only instance of legislation on bush fires from West Africa. The bulk of the legislation comes from the more arid eastern side of Africa where the dangers of denudation and erosion are more urgent, and dates from more recent times when governments have become increasingly alive to these problems.

Tanganyika has a Grass Fires (Control) Ordinance, 1943, which the Governor-in-Council may apply to gazetted areas. In such areas no one shall, without a permit from the district commissioner, burn vegetation not his property, or start fires which are likely to become dangerous to the property of others. When burning under permit, two days' notice must be given to all owners or occupiers of land within half a mile. In 1949 this ordinance was applied to the extensive Masai district; in 1954 to Mbeya and Iringa districts.

In Northern Rhodesia, the Control of Bush Fires and Trespass Ordinance, 1948, (which replaced an older ordinance on the same subject) empowers the Governor-in-Council to appoint a Central Fire Board and Local Fire Boards. The former is to advise the Governor on the subject, and the latter may appoint paid or honorary fire rangers. A Local Fire Board or a district commissioner may prohibit burning except at certain seasons or under conditions. A number of orders has been made under this clause, the effect of most of which is to prohibit burning except under permit during a specified period of the year, which normally runs from some date in May-July to another in October-December. Under the more recent orders, permits must be obtained from the district commissioner at least 3 weeks in advance of the burning itself. Two days' notice to owners or occupiers of land within half a mile must be given before burning vegetation (except, by an amendment of 1950, when burned before a date fixed by a Local Fire Board). Owners or occupiers constructing boundary firebreaks may call on their neighbours for half the labour or cost of doing so. Counter-firing for protection against a fire already started is permitted at all seasons.

Very similar provisions are made in Kenya by the Grass Fires (Control) Ordinance (1942), except that the two days' notice to neighbours is waived in native areas. Orders prohibiting or regulating the burning of vegetation may be made by various specified local authorities. The firebreaks which adjoining owners may be called upon to assist with are here required to be not less than 30 ft. wide. As in all these East African ordinances, a clause is included by which all persons may be called upon at need to assist in extinguishing dangerous fires. Another very similar ordinance in Nyasaland was repealed when the Natural Resources Ordinance was passed in 1949, but regulations made under it remained in force for some time longer, prohibiting grass-burning in most districts from some date in August-October up to the end of the year.

This brings us to the consideration of the group of Natural Resources Ordinances, the only ones in this field of legislation which show any indication of deliberate uniformity. These all appear to have been modelled on the Natural Resources Act, 1941, of Southern Rhodesia, which seems to have so impressed some of the surrounding territories that they decided to copy it. The first to do so was Nyasaland with its Natural Resources Ordinance of 1946—later repealed and superseded by the re-drafted and improved version of 1949. Tanganyika followed suit in 1948, and Northern Rhodesia in 1950. The only non-African territory which has so far adopted such an ordinance is Sarawak, in 1949. It is difficult to see why this one alone of the Asiatic territories should have found it necessary; but erosion is certainly a serious danger in Sarawak, especially in connexion with dry rice planting, and the territory had shown earlier legislative consciousness of the problem by its Order No. E-5 (Prevention of Erosion), 1941.

These ordinances have a very wide aim: to conserve existing vegetation and other resources,

prevent soil erosion, to maintain soil fertility and stream flow and so on ; grass burning is only a minor and incidental matter among many with which they may deal. The wording and general form of all the ordinances is very similar. They establish a central Natural Resources Board with both official and non-official membership, as in Tanganyika and Sarawak, or Provincial and District Boards, as in Nyasaland ; in Northern Rhodesia a central Board is supported by Intensive Conservation Area Committees in charge of local schemes. The ordinance is generally followed by the promulgation of Natural Resources Rules which give very wide powers to government to enforce rules, recommended by the Boards, for soil conservation works, de-stocking and similar objects.

As has been said, the control of grass burning is not a major object of the Boards in all these territories, and in fact, as we have seen, Tanganyika and Northern Rhodesia have retained earlier ordinances on this subject under which the necessary action continues to be taken. Nevertheless, the Natural Resources Ordinances provide a mechanism which is sometimes used for the purpose, and this may well be an increasing tendency in the colonial territories in the future. In Nyasaland, the Natural Resources (Amendment) Ordinance, 1952, gives power to the Governor-in-Council to make rules prescribing the powers of Provincial and District Boards in relation to the prevention and control of bush fires. Such rules were promulgated in the same year. The first order resulting was the Control of Bush Fires (Northern Province) Order, 1952, which prohibited all burning of growing grass or bush except under permit from the Executive Officer of the Provincial or District Natural Resources Board ; and even these officers might not grant permits before the first rains without the express sanction of the Provincial Board. A corresponding order for the Central Province makes a permit necessary only between dates specified for individual areas (from some date in July-September to 31 December). Permits are to state the exact area to be burned. Rules for the Southern Province issued in 1953 are very similar to the last-mentioned. In such orders, we have the beginnings of divergence in legislative requirements—perhaps indeed desirable to suit local circumstances—not only between territories but between provinces within a territory.

In Sarawak, the Natural Resources (Amendment) Ordinance, 1952, again confers powers to prohibit, restrict, or control the firing of vegetation. No immediate use was, however, made of these powers.

This catalogue of legislation referring to grass burning in eastern Africa has taken some time to rehearse, but in fact it all boils down to one simple principle. A mechanism is provided by which, at least in danger areas, grass burning can be restricted to the early part of the major dry season. Such "early burning" is opposed to the "late burning" at the end of the dry season, which, under unrestricted conditions, is the usual practice because the grass is then drier, and fires are easier to start and to maintain. If grass burning is to be tolerated at all, experience has shown that at least in eastern tropical Africa, early burning is preferable for two main reasons : (a) because, the grass not being so completely inflammable, the destruction of potential humus-forming material is not so great and the soil is not so completely bared to erosion, (b) because the grass has time to make renewed growth and provide some cover to the soil before the coming of the rains, which would otherwise cause much more erosion. It is significant that the only mainland East African territory not to have legislation directly referring to grass burning is Uganda, which has, in general, a higher and more reliable rainfall than the others ; renewed growth of grass is quicker and more certain after a burn, and the disadvantages of burning correspondingly less. Having in some respects a more West African than East African climate, Uganda also shares with the West African territories the general absence of legislation on this subject.

We have now covered the colonial legislation which is aimed directly at controlling the burning of vegetation ; but there remain to be considered some other types of legislation which have an incidental effect on it. One such group is the Tsetse Control Ordinances of the various African territories. The one exception to the general desirability of early burning is where the burning of bush is undertaken for tsetse control. Here maximum destruction of bush is the main consideration, hence burning late in the dry season is desirable to achieve this object. To allow of this being done in tsetse-infested areas, it is necessary to provide for separate sets of rules to govern burning in these areas. Tsetse, or Tsetse Fly, Control Ordinances are in force in Northern Rhodesia, Tanganyika and Uganda. In very similar terms they give powers to the Governor-in-Council to declare any area as a tsetse fly area, and to make regulations for any such area for various purposes including the prohibition or regulation of grass burning. The areas covered by such regulations in the territories concerned are very considerable ; in Tanganyika, eight whole provinces were declared to be tsetse fly areas in 1944—but regulations controlling burning are not necessarily always applied to such areas when they are declared.

Another group of ordinances which affects grass burning is the Forest Ordinances of the colonies. These are part of the subject of forest law, which is too large to be gone into here, but the point must be made that they often in practice relate to considerable areas of grassland. Certain governments, such as that of Uganda, have proclaimed as

forest reserves areas which contain a large proportion of savannah and grassland ; and, in some cases in these areas, early burning is regularly practised by the Forest Department with the laudable object of preventing the more destructive late fires and so inducing a thickening up of the woody vegetation—an object which in places is being successfully achieved. It is therefore one of the odd irrationalities of the subject to find that, whereas some Forest Ordinances allow fire to be set in forest reserves for beneficial purposes, others prohibit all use of fire and thus tie the hands of government staff. Thus the Uganda Forests Ordinance prohibits the lighting of fires in forest reserves except by a Forest Officer for beneficial purposes ; but in the neighbouring Sudan the Central Forest Ordinance, 1932, makes it illegal for any person to cause fire in a reserve. In other cases, such as Tanganyika and Nyasaland, the relevant ordinance merely empowers the responsible authority to make rules for fire control in forest reserves, a much more elastic arrangement.

Finally there are ordinances which merely impose a prohibition on the destruction or clearing of vegetation. It is uncertain whether the courts would interpret these phrases as including the setting of fire to vegetation, and it is not for a layman to offer an opinion. Such cases occur in the Vegetation (Public Lands) Protection Ordinance (1940) of Aden, which prohibits the cutting or destruction of vegetation on public lands except where a licence has been granted ; under the Hill Lands Ordinance, 1937, of the Straits Settlements where certain lands may not be cleared of vegetation except by permit of the Collector ; and under the Silt Control Enactment (1922) of the Federated Malay States where a district officer may prohibit the destruction of vegetation over specified areas. It is unlikely that the framers of these laws really had fire in their minds. In Aden the vegetation would usually be too sparse to support a running fire, while it seems unlikely that anyone would wish wantonly to destroy what little grazing is available ; while in Malaya, fires would be an unlikely danger because of the other extreme of wetness.

Having now discussed all that is relevant of central government legislation in the colonies, there still remains one field to explore—the Native Authority "rules," "regulations," "resolutions" or " bye-laws" as they are variously termed, which have local application. In this field the student is unfortunately handicapped by the absence of published compilations of complete sets of Native Authority rules for any British territory—one of the worst lacunae in our colonial records. Nevertheless it is known that in certain cases, Native Authorities have passed rules about grass burning. In Kenya, Meek (1) has recorded that many Local Native Councils adopted a standard set of resolutions on soil conservation under the Native Authority Ordinance (1937). One of these resolutions was that no person should set fire to any live grass, bush, undergrowth or forest. This seems to have been a unique attempt in British colonial territories to impose a total prohibition on bush fires, and one wonders how far it was ever really enforced in practice. Another standard resolution empowered headmen to call out all able-bodied men for the prevention of the destruction of vegetation by fire on unoccupied land. In the Northern Territories of the Gold Coast, Lynn (2) records a case in which the chiefs, who had originally accepted grass burning regulations with some reluctance, were so impressed with the results that in 1945 they wished to extend the same control to the crop stubbles. How many more of these local regulations may be in force, literally no one knows.

Now that we have passed in review the colonial legislation on the burning of vegetation, it is time to summarize the impressions formed from a study of it. The main impression must be of the completely irrational nature of the divergences and inconsistencies between the various ordinances, going far beyond the differences which are required to meet different local conditions. If one Caribbean sugar island requires an ordinance to control cane burning, why does not another ? Why does one territory insist on firebreaks being much wider than another with similar conditions ? Has Sierra Leone cumbered her statute book unnecessarily with legislation to enforce protective belts along roads, or have the other West African territories missed some benefit they might be enjoying ? Why do some governments use their Natural Resources Ordinances to control grass burning, while others which have adopted them retain older legislation for the purpose instead of stream-lining their laws ? Such questions may be endlessly asked and variously answered.

One point of particular interest is the duty imposed by some, but not all, ordinances on the holders of permits to burn (but never on the permit-issuing authority) to give notice to neighbours of the intention to burn. This raises an interesting moral point on how far legislators should attempt to ensure that farmers are warned, where it is perfectly possible, of events which may threaten their property. The point arises, in curiously similar form, in some other branches of colonial agricultural legislation. The ordinances dealing with notifiable diseases of animals in the Gambia and Sierra Leone (both of 1944) lay down that when such a disease is reported to a government authority, the district officer must make known to all stockowners the presence of the disease in the area. No such provision appears to be included in

ne corresponding ordinance of any other colonial erritory. It seems that some governments are more enevolent than others.

It is quite obvious that in the main the incon-stencies noted above are the result, not of inten-on, but of ignorance of what laws are in existence lsewhere and of their effect. Colonial ordinances ealing with agriculture are usually outlined in the ffice of the Director of Agriculture and then put nto legal form by the government's legal drafts-nen. The former certainly will have little know-dge of the law of other territories : a few statutes hich are mentioned in the agricultural text-books, few more by hearsay, and perhaps more detailed nowledge of the laws of some other territory in hich he has served himself. The latter will know ither more of the law of other colonies ; but they re rarely omniscient, especially in technical gislation. It is not, in fact, practicable to main-in in a colonial secretariat complete copies of the gislation of all other colonial territories. This vast ulk of material is only received, and maintained ore or less up to date, in two or three government nd university libraries in Great Britain, in which also at least some of the legislation of foreign overseas territories is available. It is only in these places that the student can make any detailed comparative study of colonial agricultural legislation. Yet the benefits from such study, as is shown by a consideration of any one topic, such as the legislation on the burning of vegetation, might be considerable.

The difficulty of detailed study is really no excuse for the rather abysmal degree of ignorance that exists. It would appear to be clearly desirable for officers of the overseas agricultural service to have rather more knowledge of agricultural law. Colonial forestry probationers are taught more about forest law than their agricultural counterparts about agricultural law. In continental European countries, trainees in tropical agriculture are nearly all required to follow a course in colonial agricultural law. It seems that this might be the most hopeful way of eventually introducing some rationalization into the system of agricultural law in the British colonies and thus permitting them to gain the benefit of one another's experience.

References

MEEK, C. K. 1949. Land law and custom in the Colonies. 2nd edn, p. 91, Oxford Univ. Press.

2. LYNN, C. W. 1949. Agricultural extension and advisory work with special reference to the Colonies. p. 38, London ; H.M. Stationery Office.

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FIELD CROPS

CEREALS

WHEAT

363 NEW ZEALAND. Wheat Research Institute. **Wheat review 1950, 1951, 1952.** 1953, pp. 68. [Christchurch] [Received May, 1954]
This review includes the following papers : (1) Survey of Hilgendorf crops ; (2) Wheat-growing in New Zealand up to 1850, by P. R. Stephens ; (3) Trend of wheat yields in New Zealand, by J. W. Calder ; (4) Recent wheat-disease problems, by I. D. Blair ; (5) The germination of seed-wheat ; (6) New Zealand and world wheat supplies, by R. McPherson ; (7) A comparison of net profits from alternative land uses in Canterbury, by A. H. Flay and P. W. Cosgriff ; (8) Seed certification ; (9) Spring-sown wheat for Canterbury ; (10) Survey of wheat-growing districts : areas and yields of varieties.—M.H.

364 O'BRIEN, E. J. and MOSS, H. J. **Quality characteristics of the Victorian wheat crop—season 1953-54.** *J. Dep. Agric. Vict.* 1954, **52,** No. 11, 497-502, illus.
This is a brief review of the 1953-4 wheat season in Victoria. Yields per ac. were high. Details are given of : the leading varieties grown in the Wimmera, Mallee and Northern districts ; the protein content of wheat samples from individual elevators ; seasonal protein variation and the analytical results for composite wheat samples.—M.P.

365 LAUMONT, P. L'orientation à donner en Oranie à la production du blé tendre. [**The trend in soft wheat production in the Oran district.**] 1953, pp. 11. [Serv. Exp. Agric., Algérie]
Soft wheat appears not to have been grown in Algeria before 1830, but since that year its area of cultivation has gradually extended. The total production of soft wheat in Algeria in 1952 was 324,900 metric tons, obtained from 423,000 ha. of which 234,000 ha., or 55% of the total, were in the Oran district. The varieties of soft wheat grown in this region are described. Measures are being taken to increase the seed production of selected varieties, a list of which is given.—E.B.O.

366 GRILLOT, G. Blés irrigués. [**Irrigated wheat.**] *Terre maroc.* 1954, **28,** No. 298, 315-28, bibl. 21. [Serv. Rech. Agron., Morocco]
An account is given of preliminary trials in Morocco to study the irrigation of wheat, also the manuring of soft- and durum-wheat varieties in relation to irrigation.—E.B.O.

367 ČERNOMAZ, P. A. [**Cultural measures to ensure high and stable yields of winter wheat in the Tambov Province.**] [Russian] *Izv. Timirjazevsk. seljshoz. Akad.* (*Bull. Timirjazev agric. Acad.*) 1954, No. 1 (5), 63-90, illus.

368 ARDAŠEV, M. I. [**Hard wheat in Baškir conditions.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 9, 102-5.
The need to increase production of hard wheat in regions of the south-east (European) USSR, Kazahstan and Western Siberia has been stressed. The poor harvests from sowings of hard wheat in Baškir are attributed to the use on collective farms of low-yielding varieties, (e.g. Melanopus 69, and the Hordeïforme types 10, 432 and 189) and to the late ripening of the crops in some years. It is claimed that, under certain cultural measures, it is possible in the Baškir area to obtain good yields of hard wheat, especially when the crop is sown (not less than 220 kg./ha. in narrow rows under conditions of the Baškir steppe) after winter rye and subsequent applications of farm manure with mineral fertilizers ; or following a herbage ley and NPK treatment. Ripening of hard wheat in Baškir is usually 5 or 8 days later than the regionalized varieties of soft wheat, but this amount of time is often saved during harvesting because the hard wheat is more resistant to lodging, which delays cutting, than is soft wheat. The hard wheat variety Narodnaja is adapted to Baškir conditions.—M.H.

369 PRUČKOVA, M. G. [**Varieties of spring wheat for virgin and abandoned lands.**] [Russian] *Izv. Timirjazevsk. seljshoz. Akad.* (*Bull. Timirjazev agric. Acad.*) 1954, No. 2(6), 3-18.
There is information on the origin and characteristics of hard and soft wheat varieties recommended for utilizing waste lands in Siberia, the Ural area, Kazahstan and the south-eastern region of European USSR. The hard wheats include : Hordeïform numbers 10, 189, 432 and 5695 ; Melanopus ; Narodnaja ; Akmolinka 5 ; and Krasnokutka. The soft wheats include : Milturum 553 ; Albidum 3700 ; Akmolinka 1 ; Lutescens 758 ; Sarrubra ; Caesium 111 ; Albidum 43 ; and Erythrospermum 841. Details of yields obtained under varying sowing dates in different provinces are tabulated.—M.H.

370 EDINBURGH AND EAST OF SCOTLAND COLLEGE OF AGRICULTURE. Field Experiments Committee. **A report on six years' experimentation with wheat varieties, 1947-1952.**

Tech. Bull. 10. Edinb. E. Scot. Coll. Agric. 1954, pp. 23.

Fully tabulated results are given of the trials with 41 varieties of winter- and spring-wheat. Yields, maturity, straw-length and straw-strength were investigated. Of the 34 varieties of winter wheat, Als was used as the control in most cases. Varieties out-yielding Als included King II and Scandia III. N.Z. Cross 7 was a very early ripener ; King II was also early, but Scandia II and III were later than Als. In the spring-wheat trials with 7 varieties (Atle as control), Pondus was the highest yielder. Fylgia was the earliest in ripening but the lowest yielder. Varietal notes for the winter- and spring-wheats used are given.—M.P.

371 NOULARD, L. Essais sur variétés de froment d'hiver. [**Trials with winter-wheat varieties.**] *Rev. Agric., Brux.* 1954, **7,** No. 11, 1309-11. [Sta. Rech., Gembloux, Belgium]

Yield trials with winter-wheat over the past 5 years have clearly demonstrated the superiority of the variety Ministre. Of the winter-hardy varieties, Leda and Panter were the most productive. A new variety, Rustique, was more winter-hardy than Leda and Panter.—D.B.

372 NOULARD, L. Essais sur variétés de froment de printemps. [**Trials with spring-wheat varieties.**] *Rev. Agric., Brux.* 1954, **7,** No. 11, 1312-14. [Sta. Rech., Gembloux, Belgium]

Performance and yields of the most important varieties of spring-wheat tested during the past 3 years are tabulated. Compared with Fylgia improvement in resistance to lodging and in productivity has been noted, especially in Jufy I, Jufy II, Phoebus and Alfy.—D.B.

373 NICHOLSON, G. **Wheat varieties recommended for 1954 sowing.** *Agric. Gaz. N.S.W.* 1954, **65,** No. 1, 5-11 and 38-40, illus.

A map of New South Wales shows the zones for which wheat variety recommendations are made. Descriptions of the recommended and some other varieties are given.—G.M.R.

374 ERROUX, J. Les céréales de l'Ouadi El Ajal (Fezzan). [**The cereals of the Wadi el Ajal, Fezzan.**] *Bull. Soc. Hist. nat. Afr. N.* 1952, **43,** 211-24, bibl. 16, illus. [Received June, 1954]

The varieties (populations) of soft wheat grown in the Wadi el Ajal are described. Local names are given. Information is also given on durum wheat, grown on a small scale, and barley. [See also *Fld Crop Abstr.* 6 : 1218 and 1219.]—E.B.O.

375 MIDDLETON, G. K. and others. **A comparison of the quantity and quality of protein in certain varieties of soft wheat.** *Agron. J.* 1954, **46,** No. 11, 500-2. [N. Carolina Agric. Exp. Sta., Raleigh]

Information is presented on 13 new wheat varieties, grown in Uniform Southern Wheat Nursery trials in the USA during 1948-50. These varieties have high protein contents and high yields. Mean yields ranged from 19·1 bu. for Purplestraw, to 29·3 bu. per ac. for Coker 47-27. Protein contents ranged from 10·1% for Hardired 47-12, to 13·3% for Atlas 66. High protein content was not associated with low yield. Five varieties with Frondoso or Fronteira in their parentage (Anderson, Coker 47-27, Taylor, Atlas 50 and Atlas 66) had average protein contents of 12·05%, with average yields of 28·8 bu. per ac. High protein contents were, in most cases, associated with high viscosity. Data are given on the grain and flour quality of the different varieties.—P.J.B.

376 VENTURA, Maria and PERINI, Gina. Prime osservazioni sull'azione di alcuni antibiotici sui vegetali. [**First observations on the effect of some antibiotics on plants.**] *Ann. Bot., Roma* 1953, **24,** No. 2, 362-71, bibl. 3, English summary p. 371. [Received February, 1955]

Three different penicillin preparations, and probably other antibiotics tested, were found to have an inhibitory effect on the germination of wheat (*Triticum vulgare*) seeds.—E.B.O.

377 NIESER, O. *Cephalaria syriaca* Schrad. als Verunreinigung von Brotgetreide. [***Cephalaria syriaca* Schrad. as an impurity in bread grains.**] *Proc. internat. Seed Test. Ass.* 1953, **18,** No. 2, 336-8. [Staatsinst. Angew. Bot., Hamburg]

Observations are made on the seed of *C. syriaca* as an impurity of wheat. Data are given on the effect of contamination by *C. syriaca* on the taste and colour of wheat flour, also the dough and baking characteristics, taken from studies on samples of Syrian wheat imported into W. Germany. Contamination of wheat to the extent of 1% of *C. syriaca* resulted in perceptible bitterness and a reduction in bread volume.—P.J.B.

378 SLINKARD, A. E. and ELLIOTT, F. C. **The effect of bunt [*Tilletia caries*] incidence on the yield of wheat in eastern Washington.** *Agron. J.* 1954, **46,** No. 10, 439-41, bibl. 9. [Washington Agric. Exp. Sta., Pullman]

379 ALGHISI, P. L'efficacia anticarie di nuovi prodotti acuprici in una prova in campagna. [**A field trial to test new non-copper preparations for bunt control.**] *Ann. Sper. agr.* 1954, **8,** No. 6, 1767-73, bibl. 3, English summary p. 1773. [Ist. Pat. Veg., Padova, Italy]

Several organic preparations were compared with Caffaro Dust (copper oxychloride) for controlling bunt (*Tilletia laevis*) on wheat. Plots 2 × 1 m. were sown with artificially infected treated seed of the wheat variety Tevere. From the results the preparations tested were placed in the following order of decreasing efficacy: FB. 1, Pentagran, S. 65, Mercurigamma, Agrosan GN, Sesan, Caffaro Dust and YF. Compared with the untreated but infected control, the efficacy of YF was significant, and that of the other preparations highly significant. In comparison with Caffaro Dust, FB. 1, Pentagran, S. 65, Mercurigamma, Agrosan GN gave highly significant differences; Sesan and YF did not give significant differences.—E.B.O.

380 GOUGH, H. C. and WOODS, A. **Seed dressings for the control of wheat bulb fly.** *Nature, Lond.* 1954, **174,** No. 4442, 1151-2, bibl. 8, illus. [NAAS, Anstey Hall, Trumpington, Cambridge]

The authors have studied the use of the following seed dressings: (1) a standard proprietary one containing 1% of an organo-mercurial fungicide applied at 2 oz. per bushel; (2) 40% gamma-BHC containing 0·8% of an organo-mercurial applied at 1 oz. per bushel; and (3) 40% Dieldrin containing 0·6% organo-mercurial (also applied at 3 oz. per bushel) to control *Leptohylemyia coarctata* on wheat. Earlier experiments gave conflicting but usually negative results. Because one of the possible reasons for this is concluded to be the length of time between the date of sowing and the egg-hatching period, the authors have studied this time factor. There is an indication that the treatments have had little or no effect on early-sown wheat (13.9.53 and 29.10.53); have had a marked effect on some late-sown wheat (6.1.54), but not on that sown on 17.12.53. It is maintained that the mode of action of insecticidal seed dressings should be investigated further.—M.H.

381 PAVLOV, A. N. [**Damage by *Eurygaster* sp. (Pentatomidae) of wheat grain under irrigation.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **98,** No. 4, 661-3, bibl. 5, illus. [Timirjazev Inst. Pl. Physiol., Acad. Sci., USSR]

It is anticipated that with the more extensive use of irrigation for crops in the south-east of European USSR there will be a great change in the insect biocoenosis. The great infestation in 1953 of *Eurygaster* sp. in the Saratov and Stalingrad provinces destroyed much of the spring-wheat grain. Work at the Engels Experimental Station (Saratov Province) on the effect of irrigation on grain quality has shown that damage by this pest is less on irrigated crops (10%) than on unirrigated crops (41%). The author's study has shown that the content in infested grain of total- and protein-nitrogen is lower compared with that of uninfested grain (observed on unirrigated but not on irrigated crops), while non-protein nitrogen of infested grain is greater than uninfested grain, whether the crop is irrigated or not. This confirms certain earlier works in which it was claimed that infested grain has a higher content of water-soluble nitrogenous substances and a lower content of total- and protein-N. It is also known that *Eurygaster* damage to grain activates proteolytic ferments. It is maintained that irrigation is a means of increasing yields of wheat grain while, at the same time, protecting the wheat from the results of damage by *Eurygaster*.—M.H.

382 HOESER, K. Über die Prüfung von Winterweizen auf Winterfestigkeit in Auswinterungskästen. [**Testing winter-wheat for winterhardiness in overwintering boxes.**] *Züchter* 1954, **24,** No. 11/12, 353-7, illus. [Bayer. Landessaatzuchtanst. Weihenstephan bei Freising/Obb., W. Germany]

Though primarily for the plant breeder, the paper is of more general interest because of the description of apparatus for determining winterhardiness of plants in the open air, and for the results which give the winterhardiness of 47 varieties of winter-wheat. They are placed in 5 classes of winter-hardiness.—D.B.

383 SCARAMELLA PETRI, Piera. È necessario il freddo per la fioritura dei nostri grani invernali? [**Is cold necessary for the flowering of our winter wheats?**] *Humus* 1954, **10,** No. 10, 9-11, bibl. 5, illus. [Ist. Bot. Univ. Bologna, Italy]

Plants of the wheat varieties Gentil Rosso, Frassineto and Rieti were grown in the laboratory at temperatures above 15°C. [15-25°C.]. Those of Gentil Rosso and Frassineto flowered and eared in 90 days and those of Rieti in 95 days, thus behaving in the same way as similar lots of plants which had been kept at low temperatures [about 4°C.] for 20 days.—E.B.O.

384 DOBBEN, W. H. van and HOOGLAND, R. F. De invloed van de temperatuur op de lengte van de bladeren bij wintergranen (Project 77). [**The influence of temperature on the length of leaves in winter cereals.**] *Rep. Cent. Inst. agric. Res., Wageningen 1953* 1954, 97-101, bibl. 1, illus., English summary pp. 100-1.

In an experiment in 1947-50 in which seeds of winter barley, wheat and rye were sown at intervals of 3-4 weeks from late September to mid-January, measurements in length of the first, second, third and fourth leaves of the main stems were taken until the maximum (ultimate) length in each leaf was reached. In the case of each leaf, the first

growing period was considered to end when the leaf reached half its ultimate length. An attempt was made to correlate the maximum length of the leaves with the average temperatures of the soil and air at soil-level, measured during the first and second period of leaf development. The average temperature was taken to be the mean of the air temperature (average for 24 hr. at 40 cm. above ground surface) and the soil temperature (8 a.m. at a depth of 10 cm.). There was a very close positive correlation between average temperature for the growing period and the ultimate length of each leaf, the correlation being closer for the first than for the second period of leaf development. The correlation coefficients for winter barley, wheat and rye, respectively, in the first growing period and for the first leaf were 0·97, 0·97 and 0·98. Comparable figures for the second period were 0·86, 0·87 and 0·92. In the case of the fourth leaf, for the first growing period, comparable figures were 0·91, 0·84 and 0·77. Thus the correlation between temperature and ultimate leaf-length was less close for the fourth than for the first leaf. Also in the case of the fourth leaf, temperature had a greater effect on ultimate leaf-length in barley than in wheat and had the least effect in respect of rye. It is suggested that length of photoperiod may be more important in the development of the fourth leaf than in the case of the first. At a given average temperature during development, the ultimate length of the fourth leaf was greater than that of the first.—W.J.B.

385 FEDOROV, A. K. [**The role of autumn light in the development of winter plants.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1953, **93,** No. 2, 361-4, bibl. 5. [Inst. Genet., Acad. Sci., USSR]

In 1949, while studying the differentiation of the stem growing-apex in relation to phasic development in winter cereals, the author concluded: (1) that differentiation of the growing apex is a result of qualitative changes which arise in the apex; and (2) that light received by winter plants in the period of their autumn growth influences the plants' further development. A series of experiments has been carried out to elucidate the latter problem and in this paper three of the tests [A, B and C] are reported. The material comprised the winter-wheat variety 2453, winter rye (Timirjasevskaja var.) and the herbage species *Festuca pratensis* and *Medicago sativa* (northern hybrid). (A) In the first test, sowings were made of winter wheat and winter rye every 10 days, from 7 Aug. to 22 Sept. By the usual method of fixing the apices and examining them under a microscope, no morphological changes (e.g. formation of ear initials) were observed throughout the autumn. From all sowings, soil monoliths containing the plants were taken on 21 Dec., and on 22 Dec. these were placed in culture vessels, most of which were put under continuous light and the remainder under natural short day on 27 Dec. In all the plants differentiation of the apices took place, that of the earlier sowings after 1 day under continuous or short day. It is therefore concluded that the plants sown early had completely satisfied their requirement for long day (necessary for ear initiation); the earlier the sowing, the less is the need for continuous light to induce ear development. Observations in the following spring on the apices of the field sowings showed the same results as in the culture test, namely, the earlier the autumn sowing, the earlier the ear initiation in spring. There is evidence that the plants in all the autumn sowings had completed the vernalization stage after the first half of November. If it is assumed that differentiation of the apices begins after the vernalization phase, then the plants in the culture vessels, and also those in the fields, should begin ear differentiation at one and the same time. This, however, was not the case, and the author assumes that the plants require, before differentiation of the apices, a certain number of long days. From this it is concluded that differentiation of the apices proceeds only on the basis of certain qualitative changes which take place in the growing points during the passing of the light phase. Apparently the light received by the plants in autumn influences their further development. (B) To study the effect of this light factor on ear initials, rye and wheat plants with undifferentiated apices, but with their need for long day satisfied, were placed at +20°C. under (1) continuous light, (2) natural 8-hour day, and (3) continuous darkness. In all 3 variants the plants began ear differentiation at the same time (in rye after 2 days, in wheat after 4 days). After 6-8 days, development of ear initials in all variants was uniform. These results were confirmed by those obtained in tests with *Festuca pratensis* and *Medicago sativa* var. The author maintains that the light stage begins and concludes before the stage of differentiation of the apices. Formation of the inflorescences arises from qualitative changes in the growing point which take place when the plants pass the light phase. The question arises, when do winter plants pass the light stage, or, more precisely, when do winter plants satisfy their need for long day in order that differentiation of the apex may take place? It is known that the light stage begins after completion of the vernalization phase. Tests made to determine the time of the end of the vernalization phase showed that in winter rye this phase ended during the first 10 days of November; in winter wheat during the second 10 days of November; and in *Festuca pratensis* at the end of November. (C) Further tests made with rye and winter wheat have shown that crops which receive continuous light in autumn form ears 1 days earlier than those under natural day; and

24 days earlier than crops under short day. Light received by winter plants in autumn, before completion of the vernalization stage, influences not only initiation of ears but also all further developmental stages in the plant, and consequently the winterhardiness and productive capacity of the plants are also affected.—M.H.

386 AVDONIN, N. S. and KUZINA, E. V. [**The causes of perishing in winter cereals in the non-chernozem belt.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 7, 9-16, illus.

Sowings of winter wheat and winter rye in the non-chernozem belt of the USSR frequently fail in the winter/spring period. Many theories have been put forward in explanation ; e.g., it is said to result from low temperatures and frost, from excessive transpiration of the plants under an ice crust, from mechanical damage to roots by frost, to the absence of plant hardening in the autumn, or to excess plant growth in autumn before the onset of winter. The author has carried out field and laboratory tests (with wheat and rye), the results of which support his contention that the primary cause of failure of these crops in peat-podzols is a lack of suitable soil nutrients. Measures (which include liming) to lower the acidity of these soils, to reduce their content of mobile forms of aluminium and manganese, and to increase the quantity of assimilable forms of phosphorus, have resulted in better overwintering of the crops in spite of unfavourable low temperatures (of air and soil).—M.H.

387 MCNEAL, F. H. and DAVIS, D. J. **Effect of nitrogen fertilization on yield, culm number and protein content of certain spring wheat varieties.** *Agron. J.* 1954, **46,** No. 8, 375-8, bibl. 6. [Montana Agric. Exp. Sta., Bozeman]

In trials in Montana, 9 varieties of spring wheat were grown in plots low in available N and received nil, 50 or 100 lb. N per ac. One 4 in. application of irrigation water was given in early July. Applications of 100 lb. N hastened maturation by 1-4 days. Ceres had the smallest increase in culm numbers of 7·5 and 31·8% over controls, where 50 and 100 lb. N per ac., respectively, were applied; respective values for Lee, which showed the greatest response, were 46·6 and 105·7%, with mean values for all varieties of 34·4 and 69%. Average yield increases of all varieties over controls were 67·2 and 114·2% for the 50 and 100 lb. N per ac. treatments, respectively. It was deduced that besides an increase in culm numbers, kernel weight and the number of kernels per head also contributed to the yield response, particularly in the cases of Ceres and N2211. The protein content of the lateral kernels of spikelets was consistently greater than that of kernels from the centre of spikelets. In all but two cases, the protein content of kernels from the middle of spikelets was higher than that of kernels from the tops of spikelets, indicating that the earliest-formed grain had the highest protein content. There were no significant differences between the protein content of kernels from main culm and tiller spikelets.—P.J.B.

388 RANVIR SINGH and ANANT RAO, N. K. **Studies on the manuring of wheat. 2. Effect of excessive nitrogenous manuring on wheat.** *Agra Univ. J. Res.* 1954, **3,** Pt. 2, 499-508, bibl. 10, illus. [Dep. Agron., B.R. Coll., Agra]

In an experiment carried out in 1950-1, ammonium sulphate was applied to plots at rates of 0, 15, 30, 45, 60, 75, 100 and 105 lb. N per ac. one day before they were sown with wheat. Applications of 75 lb. and more N per ac. caused the wheat crop to lodge, and this lodging increased with increasing applications of N. The lodged area occupied 27% and 40% of the total area at the 75 lb. and 105 lb. levels of N, respectively. Lodging reduced the grain yield by 46% and 50% at the same N levels. The 1000-grain weight increased with increasing levels of N application up to 60 lb. and thereafter gradually decreased with increasing applications of N.—W.J.B.

389 SCHMELING, B. von. Die Wirkung der N-Düngung bei verschiedenen Winterweizen- und Sommergerstensorten. [**The influence of nitrogen manuring on different varieties of winter wheat and summer barley. 2nd communication.**] *Z. Pflbau* 1954, **5,** No. 3, 116-22, bibl. 20. [Techn. Hochsch., München-Weihenstephan]

This second part deals with wheat only. Seven varieties of winter wheat were treated with increasing applications of N (from 0-80 kg. N/ha.), and the effect of these different rates on 1000-grain weight, crude protein, and α and β amylase (total, free and bound) was determined. In all varieties, the lowest 1000-grain weight was obtained when N was applied at 80 kg./ha. With increasing applications of N, crude protein and β amylase activity increased, the latter especially at 80 kg./ha., while α amylase activity was independent of the rate of N application. Free amylase increased only slightly but bound amylase was almost doubled by increasing the N supply from 0-80 kg./ha.—D.B.

390 WESSELS, D. G. and PRETORIUS, T. P. **Fertilizer experiments at the Vaalhartz Agricultural Research Station (1946-1950).** *Sci. Bull. 338. Dep. Agric. S. Afr.* 1953, pp. 76, bibl. in text, illus.

Wheat, pp. 5-20, 26-38. Fertilizer experiments were carried out on several crops grown in rotation and under irrigation. Nitrogen was always beneficial to wheat growth and yields. 400 lb. super-

phosphate per morgen [1 morgen=2·116 ac.] were adequate, crop yields thereafter depending on available N. The highest protein content was found in Rooiwol wheat treated with 20 tons of kraal manure per morgen. The wheat varieties responded differently in protein content to the source of phosphate. Superphosphate raised the phosphate content, but nitrogen lowered it. A top-dressing of 200 lb. ammonium sulphate per morgen gave the highest yields when applied with the seed. Wheat sown on lucerne land the day after the lucerne had been turned in did not make full use of the lucerne nitrogen.—M.P.

391 El Rafie, M. S. **Fumigation of agricultural products. 10. Sorption of carbon disulphide by wheat and flour.** *J. Sci. Fd Agric.* 1954, **5,** No. 11, 536-41, bibl. 12, illus. [Imp. Coll. Fld Sta., Sunninghill]

The sorption of carbon disulphide is found to be critically dependent on the moisture content of the sorbent, with a minimum sorption at about 14% of water. The sorption of carbon disulphide is even lower than that of methyl bromide, and seems to be mainly physical in origin. Most of the sorbed fumigant is recoverable, the remainder is held chiefly in the bran and endosperm. At high moisture contents, the seed-coat no longer inhibits sorption, which tends to the same limit as that exhibited by wholemeal flour.—From author's summary.

BUCKWHEAT

392 Anohin, A. N. [**High yields of buckwheat in White Russia.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 10, 48-50.

In White Russia, buckwheat [*Fagopyrum* sp.] comprises 9-11% of the total area of spring sowings. Information is supplied on the cultural measures and harvests obtained from this crop when grown on various farms in different regions of White Russia (average annual yields 1000-1300 kg./ha. in the various provinces).—M.H.

OATS

393 Scottish Agriculture. **Notes from Auchincruive—VIII.** *Scot. Agric.* 1954, **34,** No. 3, 170-1.

In previous trials, the resistance to lodging of mixed crops of oats + barley had been found greater than that of pure stands of barley. In 1954 trials, the effect on lodging of different rates of oats included in oats + barley mixtures was studied. Barley was sown alone and with 0·5, 0·75 and 1·5 bu. per ac. of oats, the sowing rate of the barley being adjusted so as to give an overall sowing rate of 200 lb./ac. The percentage of the total area of crop lodged on 20 August was approximately 85% for the pure stand of barley and 55, 45 and 40% where oats were included at a rate of 0·5, 0·75 and 1·5 bu. per ac., respectively, in the mixtures. It was apparent that even where small proportions of oats were added to the mixture, the standing power of the crop was markedly increased over that of barley sown alone.—P.J.B.

394 Dobben, W. H. van. Zomergerst en haver op zandgrond en hun gevoeligheid voor concurrentie. [**Sensitivity to competition of oats and barley grown on sandy soil.**] *Rep. Cent. Inst. agric. Res., Wageningen 1953* 1954, 93-7, bibl. 2, illus., English summary pp. 96-7.

An analysis was made of the influence of environmental factors on the competition between oats and barley grown as mixed crops in the 1951-3 experiments already reported in *Fld Crop Abstr.* 7:1138. The yields of grain by Herta spring barley and Libertas spring oats, grown separately and as mixed crops, were compared at various levels of soil productivity, and at various pH levels. Oat yields from pure stands were not affected by pH over the pH range of the experiment. It is stated that differences in soil productivity (measured in terms of the yields of oats grown as pure stands) were primarily due to differences in water supply, i.e. relatively high oat yields indicated relatively good supplies of water. On plots located on soils where pure oats stands yielded 4200, 3500-4200 and 3500 kg. per ha., respectively (i.e. plots with a decreasing order of water supply), the percentage of barley grain in the total grain yield from oats and barley, grown as pure stands on equal areas, was 46·6, 48·5 and 52·2%, respectively. Thus, the yields of pure stands of barley, in relation to yields of pure stands of oats on comparable plots, increased with decreasing soil productivity which reflected decreasing water supply. On plots of the same 3 soil-productivity groups, when 1 : 1 mixtures of barley and oats were grown, the percentage barley grain in the total yield of grain was 46·1, 52·0 and 56·4%, respectively. Thus, the progressively better performance of barley, compared with oats, with decreasing water supply, already noted in the case of unmixed crops, was even more marked when the crops were grown in competition with each other. Results were similar in 1951 and 1952. The percentage of barley grain in the total grain yield from oats and barley, grown as pure stands on equal areas in 1953, was 49·1, 48·1 and 47% at pH (KCl) values of >5·3, 4·6-5·3 and <4·6, respectively. pH 4·6 (KCl) is roughly equivalent to pH 5·5 (water). When barley and oats were grown as 1 : 1 mixtures, comparable percentages for barley were 60·8, 51·8 and 41·2%. Thus, barley performed increasingly better, compared with oats, at progressively higher

pH values, and the effect was more marked when the crops were in competition than when grown as pure stands. At pH (water) values of over 5·5 barley yielded on an average 8% less than oats but as the S.E. content of the barley was 16% greater than that of oats, the nutrient yield of barley exceeded that of oats.—W.J.B.

395 REEVES, J. T. **Oats and barley in Western Australia.** *J. Dep. Agric. W. Aust.* 1954, **3,** No. 4, 453-61, bibl. 2, illus.

The oat varieties Ballidu, Wongan and Dale are grown for grain, early grazing and hay. The results of variety trials at different research stations are discussed. A new crossbred, W.29, a midseason oat variety, showed high-yielding ability and good agronomic characteristics. The 6-row barleys, Atlas, Cape and Californian are mainly grown for export or local stock feed. The principal 2-row barleys grown for local malting are Prior and Maltworthy. In variety trials at Avondale, Freja yielded best at 27·1 bu. per ac. ; Maltworthy gave 26·3 bu. per ac. Barley and oat varieties are recommended for the various rainfall zones.—M.P.

396 MURPHY, H. C. **Registration of oat varieties, 19.** *Agron. J.* 1954, **46,** No. 11, 525, bibl. 7. [Fld Crops Res. Br., Agric. Res. Serv., U.S. Dep. Agric.]

A description is given of Delair (Reg. No. 132) oats, which was derived from a Fulghum (H.C. 726) × Bond cross. It is an early-maturing, stiff-strawed variety, with sufficient winterhardiness to be suitable for growing in the Stoneville region and points further south in the Delta region of Mississippi. Delair is well suited for autumn grazing. In trials at Stoneville, Mississippi, during 1948-53, the average grain yields of Delair, Nortex 107 and Delta Red 88 were 62·7, 64·9 and 67·5 bu. per ac., respectively. Delair matured, on average, 5 days earlier than the other two varieties.—P.J.B.

397 DIRKS, V. A. **Dupree and Waubay. Two new oats for South Dakota.** *Bull. 436. S. Dakota agric. Exp. Sta.* 1954, pp. 8.

Dupree is a selection from an (Anthony × Bond) × (Richland × Fulghum) cross and is adapted to central and western S. Dakota. It is an early, vigorous variety, with a high level of resistance to heat and drought. Under conditions of limited moisture at 4 locations in 1949, '50 and '52, the average yields of Dupree, Andrew, Clinton, Vikota and Brunker were 49, 47·3, 44·6, 47·6 and 44·2 bu. per ac., while under conditions of abundant moisture (where Dupree is liable to lodge) average yields were 78·2, 78.1, 75·5, 83·5 and 69·6 bu. per ac., respectively. Waubay was selected from a Clinton × Marion cross and is adapted to eastern S. Dakota. It is a fairly late-maturing variety, is stiff-strawed and is inferior to Dupree in heat- and drought-resistance. This variety is regarded as of value as a stiff-strawed replacement for Marion. In uniform nursery trials in the North Central region, Waubay has outyielded Clinton and Marion by 11 and 5%, respectively, over a 4-year period.—P.J.B.

398† LAKON, G. Der Keimwert der nackten Karyopsen im Saatgut von Hafer und Timothee. [**The germinability of the naked caryopsides of oat and timothy seed.**] *Saatgutwirtschaft* 1954, **6,** No. 9, 233-5.

This first part is a review of the literature on the germination and subsequent yield of husked grain. The bibliography is given with the second part of the paper. [See next abstract.]—D.B.

399† LAKON, G. Der Keimwert der nackten Karyopsen im Saatgut von Hafer und Timothee. [**The germination value of naked caryopsides in seed of oat and timothy.**] *Saatgutwirtschaft* 1954, **6,** No. 10, 259-62, bibl. 36.

Experiments were conducted to resolve the conflicting statements in the literature [see previous abstract] regarding the reduced germinability of husked seeds. Germination capacity was determined by (1) the topographical tetrazolium method and (2) percentage germination, in seed of *Triticum spelta, Avena sativa* and *Phleum pratense* in three conditions : with husks, husked by hand, husked by machine. In all cases, seed with husks and hand-husked seed behaved similarly in their reaction to the topographical tetrazolium test and the germination test, whereas in the machine-husked seed the germinability was greatly reduced. This was also demonstrated by the distribution of the seed coloration during the tetrazolium test. *A. sativa* and *Ph. pratense* were sensitive to very small injury which could only be detected by the topographical tetrazolium method.—D.B.

400 BREESE, T. C. and HIRST, R. H. **Early spraying of spring oats with MCPA (potassium).** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 7, bibl. 4. [Plant Protection, Ltd.]

In trials in 1954, applications of 4, 6, 12, 16 and 24 oz. a.e. of MCPA K salt in 12 gal. spray volume were made to spring oats at the following growth stages, (a) 0-3 leaves on main shoot, (b) 3-5 leaves on main shoot and (c) over 5 leaves on main shoot. No growth retardation was noted following any treatment. Some plant deformity was caused by spraying at all growth stages, but was negligible where spraying was done at stage (c). Resistant weeds which may best be controlled by spraying in the cotyledon stage were not prevalent in these trials. Charlock (*Sinapis arvensis*) was effectively

controlled when sprayed with low rates of MCPA at stage (b). The best control of *Cirsium arvense* and *Sonchus arvensis* was obtained by treatment at stage (c).—P.J.B.

401 ELLIOTT, J. G. and FRYER, J. D. **The effects of MCPA (sodium) and 2,4-D (amine) applied to spring oats at the 1 to 3 leaf stage.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 7, bibl. 1. [A.R.C. Unit Exp. Agron., Oxford]

The results are given of 1 trial in 1953 and 5 in 1954 to compare the herbicidal effectiveness of 2,4-D and MCPA applied to spring oats in the 1- to 3-leaf and in the 6-leaf stage of growth, the latter being the normally recommended stage for spraying. In the 1953 trial, 2,4-D triethanolamine salt and MCPA Na salt at rates of 1 or 2 lb. a.e. per ac. were applied at 3 growth stages from the 1- to 6-leaf stage. In the 1954 trials, rates of treatment were 0·25 and 0·75 lb. a.e. per ac. for 2,4-D and 1·5 lb. a.e. for MCPA and the herbicides were applied either at the 1- to 3-leaf stage, or at the 6-leaf stage in 7·2 gal. spray volume per ac. Data are given of the kill or growth check given to different weed species in the spring oats, including : *Veronica* spp., *Polygonum aviculare*, *P. persicaria*, *Stellaria media*, *Matricaria* sp., *Chenopodium album*, *Viola tricolor*, *Vicia sativa* and *Spergula arvensis*. In most cases, except where low rates of 2,4-D or MCPA were applied, some herbicidal effect on these weeds was obtained. In almost every case, weed control was best where the herbicides were applied at the early-growth stage of the oats ; in most cases, low rates of 2,4-D or MCPA applied at this stage gave better weed control than where applied at high rates at the 6-leaf stage. From field observations, MCPA applied at either the 1- to 3-leaf or at the 6-leaf stage caused no malformation in the crop, while the 0·75 lb. rate of 2,4-D at both growth stages caused mild deformities. Crop yields in the 1954 trials in most cases showed no positive effect from the herbicidal treatments ; in this year, weather conditions prevented serious competition between the oats and weeds on control plots. In 1953, however, grain yields were markedly increased by treatment with 1 or 2 lb. MCPA, or 2 lb. 2,4-D at the 2-leaf stage, but not at the 6-leaf stage. Normally resistant weed species received a serious growth check when treated at the cotyledon or early-leaf stage, with severe reduction of their ability to compete with the crop. It was concluded that MCPA Na salt could be used on spring oats at the 1- to 3-leaf stage without harming the crop. Crop deformities caused by 2,4-D appeared likely to limit the use of this material at early growth stages.—P.J.B.

402 JOHNSON, I. J. **Effect of 2,4-D treatment of oats on the succeeding crop.** *Agron. J.* 1954, **46,** No. 10, 475-6. [Iowa Agric. Exp. Sta., Ames]

Plots of Andrew and Cherokee oats were treated with 1 lb. acid equivalent of 2,4-D at 12 different growth stages, ranging from 9 to 56 days after sowing. Data are given of the grain yields of the treated crop and of the yields of plants grown from seed taken from the treated crop. In the case of Andrew, crops treated at 30 and 52 days after sowing produced progeny giving significantly lower yields than untreated controls ; with Cherokee, crops treated at 26, 34, 38, 42 and 47 days after sowing produced progeny giving significantly reduced yields. In most cases significant yield reductions in the progeny occurred where the parent crop had also suffered the greatest yield reduction. Reductions in the yield of the progeny were largely due to reductions in seed plumpness and germination following treatment of the parent crop.—P.J.B.

403 LAPALME, A. Nature de la résistance de l'avoine à la rouille de la tige. [**Nature of the resistance of oats to stem rust.**] *Rev. Oka* 1954, **28,** No. 5, 138-54, bibl. 49.

This review is concerned with the following points, amongst others : clearance of barberry, many species of which are host-plants for *Puccinia graminis* ; use of rust-resistant varieties of oats, with an annotated list of oat varieties recommended for Quebec ; cultural and chemical methods of rust control. A list is given of rust-resistant species and varieties of *Berberis* and *Mahonia*.—E.B.O.

404† GOODWIN, R. H. and POLLOCK, B. M. **Studies on roots. 1. Properties and distribution of fluorescent constituents in *Avena* roots.** *Amer. J. Bot.* 1954, **41,** No. 6, 516-20, bibl. 11, illus. [Connecticut Coll., New London]

The properties and distribution of the principal fluorescent constituents of *Avena sativa* roots are described. A blue-fluorescing glycoside or glycoside complex of an unidentified aglycon occurs in the meristem, and, in much lower concentrations, in the older portions of the root. Scopoletin (6-methoxy-7-hydroxy coumarin) and a glycoside of this compound are present in the elongating and mature portions of the root, but are nearly absent from the meristem. In the zone of cell elongation there is slightly more scopoletin present as aglycon than as glycoside ; while in the mature root nearly 75 per cent of the scopoletin is present as glycoside. —Authors' summary.

405 THURMAN, R. L. and GRISSOM, P. **Relationship of top and root growth of oats.** *Agron. J.* 1954, **46,** No. 10, 474-5. [Arkansas Agric. Exp. Sta., Fayetteville]

In greenhouse experiments, 3 varieties of oats were

ubjected to 4 clipping treatments as follows : (a) lipped on 1, 10, 20 and 28 February, (b) clipped on 0, 20 and 28 February, (c) clipped on 20 and 28 ebruary, and (d) left unclipped. Clipping heights vere either to 1·5 in. above soil level (low) or to bove the terminal growth area (high). The yield rom the first clipping was discarded. The mean ield of regrowth following treatments (a), (b) and c) was 3·22, 3·89 and 6·21 g. per 10 plants where he plants were clipped low, and 11·31, 8·58 and 1·95 g. where they were clipped high ; mean oot-weights for plants clipped low were 0·89, 4·9 nd 9·5 g. and 5, 6·4 and 15·46 g. where they were lipped high, respectively. From these results, he adverse effect of repeated, heavy defoliation f oats on plant recovery and root production, vas apparent. The results of other field trials, n which oats were subjected to different clipping reatments in autumn, are also presented ; in these, lipping or grazing treatments significantly reduced orage and grain yields, compared with unclipped r ungrazed plants.—P.J.B.

06 GRAFIUS J. E. and BROWN, H. M. **Lodging resistance in oats.** *Agron. J.* 1954, **46,** No. 9, 414-18, bibl. 12, illus. [Michigan State Coll., East Lansing]

n these studies, an attempt was made to provide simple method, based on physical mechanics, or determining the resistance of oat varieties to odging. Lodging at the dough-stage was studied nd the question of crinkling and stem breaking uring plant senescence was not considered. Three ypothetical types of oat-stem bending are proosed : (1) bending confined to the culm base and ssociated with root lodging, (2) relatively uniform ending throughout the culm length, and (3) bending mainly confined to the top of the culm. In tudies with 81 oat varieties, the culm response to eights hung on the base of the panicle ranged om the second to the third type of culm curature. An equation is deduced for the path of the ase of the panicle during bending, leading to odging. The equation is as follows : $x^2=a^2\left(1-\frac{y^2}{b^2}\right)$, here a = length of horizontal axis, b = height of lant to base of panicle and x and y = cartesian o-ordinates for the position of the panicle base at given instant. For the 3 types of bending preiously referred to, values for a are 2, 1·8 and 1·5, espectively, while the value for b remains constant t 2. Lodging is defined as the extent of response to orque exerted by external forces ; the resistance to odging is defined as the ratio of the additional orque (over and above that exerted by the weight f culm, head and leaves) that a culm is capable of ithstanding, to the torque applied by external orces, such as wind and rain. For this, an equation $L_r = \frac{aF}{bx}$ was deduced, where a and b are as defined above, c, = the proportionality constant to convert b into force, based on the assumption that the external force applied as wind or rain is approximately proportional to height, F = the force applied and x = the horizontal length of the lever. The lodging resistance factor, cL_r had good repeatability, was highly significantly correlated with lodging and was effective in selecting for resistance to lodging. Strains with a cL_r factor of 0·4, or more, did not lodge, while those with factors less than 0·3 lodged severely.—P.J.B.

407 BOKEN, Else. Gødskningens indflydelse på planternes procentiske næringsstofindhold. [**The effect of manurial treatment on the percentage content of nutrients in plants.**] *Ugeskr. Landm.* 1955, **100,** No. 3, 43-5, bibl. 4.

Observations are made, using data taken from pot trials, on the Mn requirements of oats and on the use of plant tissue analysis for determining the manurial requirement of crops.—P.J.B.

408 WESSELS, D. G. and PRETORIUS, T. P. **Fertilizer experiments at the Vaalhartz Agricultural Research Station (1946-1950).** *Sci. Bull. 338. Dep. Agric. S. Afr.* 1953, pp. 76, bibl. in text, illus.

Oats, pp. 5-16, 33-5. The use of different fertilizers on crops grown in rotation showed that the addition of N always increased the yield of oats, though its effect was more marked on hay yields than on grain yields. Kraal manure when applied with superphosphate gave the best yields of all fertilizer combinations. Kraal manure also gave the highest protein content. 200 lb. of ammonium sulphate per morgen [1 morgen = 2·116 ac.] applied at sowing was important for increasng grain- and hay-yields; the addition of nitrogenous fertilizers when the seed was being formed raised the protein content of the grain. The phosphorus content fell with increasing amounts of nitrogen added.—M.P.

409 COFFMAN, F. A. **Varietal purity [in oats] and the prospect ahead.** *Agron. J.* 1954, **46,** No. 9, 431, bibl. 5. [Oat Invest. Dep., U.S. Dep. Agric.]

A note is given on the increasing prevalence of aberrant or off-type plants produced by recently-distributed oat varieties in the USA. This incidence of aberrant types is largely ascribed to the use of *Avena byzantina* as a source of genes for disease resistance for the production of these new varieties. It appears that varieties of *A. byzantina* which possess valuable genes for disease resistance frequently exhibit genetic instability and are prone to produce off-types. The continuation of oat-breeding programmes directed to producing disease resistance will, it is thought, increase the incidence of off-type plants. This fact, it is held, should be

acknowledged and adjustments in the purity standards should be made accordingly.—P.J.B.

RYE

410 HINTZER, H. M. R. and DE MIRANDA, H. **Investigations on the baking quality of diploid and tetraploid rye.** *Neth. J. agric. Sci.* 1954, **2,** No. 3, 155-67, bibl. 17, illus.

The protein content of the tetraploid rye grain was higher than that of diploid rye. There was also an indication that tetraploid rye grain was less susceptible than diploid grain to loss of baking quality caused by sprouting.—W.J.B.

BARLEY

411 MALCOLM, J. P. **The production of malting barley.** *Bull. 3. Canterbury (N.Z.) Malting Co. Ltd.* 1954, pp. 20, illus.

An account is given of the cultivation of barley for malting in the Canterbury area of N.Z. Two-thirds of the 1953-4 crop grown was the Kenia variety, which, with Research, comprised the two main varieties grown ; these proved superior to all other varieties tried so far. Kenia is resistant to lodging and may do better on very fertile land, while Research may do better on light land in a dry season. Yields from the two varieties are similar, but both varieties are susceptible to neck-break and severe wind-damage by north-west winds before harvest. A map is given showing which varieties (Kenia or Research, or both) are recommended for each district. The 3 important factors governing malting quality in barley are (a) maturity of the crop and moisture content of the grain, (b) the percentage of skinned and broken grains, (c) the percentage screenings. It has been found that the screening percentages of farmers' lines tend to increase with later sowing. Details are given of the maximum allowances in No. 1. grade malting barley. The sodium salt of MCPA is recommended in preference to other chemicals, for weed-control, at the rate of 0·5 to 0·75 lb. acid equivalent per ac. The higher rate should be used when spraying is carried out before mid-November.—M.P.

412 MOËS, A. L'accroissement de la productivité des orges d'hiver. [**Increase in the productivity of winter-barley.**] *Rev. Agric., Brux.* 1954, **7,** No. 11, 1299-301. [Sta. Rech., Gembloux, Belgium]

The first part of the paper gives yields and other properties of new lines and crosses of winter-barley which have been under trial. A stage is now being reached when new varieties of barley which are very much superior to those at present being cultivated will soon be available. Concerning cultivation techniques for increasing the yield of winter-barley, it is stated that date of sowing is a major factor. Tabulated data on the course of development, height of stem, resistance to lodging, and yields show that, in Belgium, the end of September is the most profitable time for sowing winter-barley.—D.B.

413 MOËS, A. La productivité de l'orge de printemps en zone limoneuse. [**Productivity of spring-barley in the clay zone.**] *Rev. Agric., Brux.* 1954, **7,** No. 11, 1302-5. [Sta. Rech., Gembloux, Belgium]

Yields of spring-barley have increased considerably in the clay areas of Belgium since the introduction of the variety Herta and, more recently, the strain Piroline. The latter is more resistant to *Oïdum* than are other varieties, but is less resistant to lodging than Herta. In these clay soils, varying the distance between rows had no significant effect on yields ; but it is noted that when sown in rows 10 cm. apart the yield was slightly, though regularly, higher than when sown in rows 20 cm. apart. Density of sowing was more important ; and in these clay soils it was necessary to sow at least at the rate of 300 seed per m^2. Date of sowing is a still more important factor governing yield. For all varieties tested, sowing on 15 March gave the highest yields ; with later sowing the yields became progressively lower, but Piroline was exceptional in that it still gave a good yield when sown in mid-April. In all varieties, resistance to lodging was greatest when sown on 30 March.—D.B.

414 NORTHERN IRELAND. Agricultural Research Institute. **Twenty-seventh Annual Report 1953-54.** *Rep. agric. Res. Inst. N. Ire.* 1954, pp. 38. [Hillsborough]

Barley varieties and manuring, pp. 20-1. In an experiment laid out in randomized blocks with 3 replications, the effect was studied of 0, 0·75, 1·5 and 2·25 cwt. ammonium sulphate per ac. on the barley varieties Freja, Herta, Ymer and Camton. Two seed rates were used, 140 lb. and 168 lb. per ac. Lodging occurred owing to the bad weather and the high fertility of the soil. Freja, Herta and Ymer responded well to the nitrogen dressings and showed considerable resistance to lodging. The two different seed rates produced no significant differences in yield. Proctor barley appears comparable to the Scandinavian varieties in yield and resistance to lodging.—M.P.

415 WAGENINGEN. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 173. Zomergerst 1955. [**Choice of varieties. Pamphlet No. 173. Spring barley, 1955.**] *Suppl. 21. LandbVoorl.* 1954, **11,** No. 12, 1-4.

The results are given of comparative trials carried out with spring barley varieties in the Netherlands

1 1954. Among malting barleys, Piroline, Balder nd Carlsberg all outyielded Kenia. Among fodder rleys the new variety Minerva gave consistently igh yields of grain.—W.J.B.

16 FEDOROV, A. K. [**The biology of development in the barley variety Pallidum-17 (" dual-purpose ").**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **98,** No. 5, 857-60, bibl. 3.

y sowing a selected barley in late autumn for any years in succession the winter-hardy variety allidum-32 was produced (see *Herb. Abstr.* 10 : 562). From selections within this hardy type the inter-hardy strain Pallidum-17 has been bred. f Pallidum-17 is sown in spring, it behaves as a ormal spring variety. In 1952 the author studied ne biology of its development in order to elucidate hy this winter-hardy strain can also behave as a pring type. There is no information in the literature on the nature of this so-called "dual purpose" except for the factual account of Flaksberg, 929). In the tests (in which the spring variety Viner was used as a control) of the effect of : (a) owing date on ear initiation ; and (b) light and emperature on growing-point differentiation, there s evidence that : (1) in regard to the vernalization tage there is practically no difference between allidum-17 and other spring barleys ; (2) in egard to light and temperature, Pallidum-17 reacts nore sharply to shortened day (requiring a longer ime to form ears) than the control and is thus nore exacting in its requirements (e.g. of long-day) or passing the light stage, especially under low emperatures.—M.H.

417 ANDERSON, S. **Environmental factors affecting the response of barley to growth regulators.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 5. bibl. 4. [Rolighedsvej 23, Copenhagen V, Denmark]

In Danish trials during 1951-3, barley was sown at 10 different dates over the course of one month and sprayed with 1 kg. of 2,4-D Na salt per ha. when the plants had 2, 2·5, or 3 leaves. The degree of toxicity of the 2,4-D was measured by counting the number of abnormal kernels each year and by recording grain yields. From records of weather conditions, i.e. sunshine intensity, temperature and rainfall at the time of treatment, it was apparent that there was no relation between weather conditions on the day of treatment and herbicidal activity, but that herbicidal activity depended largely on the weather during the few days subsequent to the time of treatment. A high number of abnormal kernels was associated with spraying after heavy rain followed by warm and sunny days. There did not appear to be any correlation between frost and a high incidence of spray damage when spraying was done on the day of frost. In pot experiments with barley, plants in pots were placed, 4 days before spraying : (a) in a greenhouse ; (b) in a garden in sunshine ; (c) as for (b), but watered heavily the day before spraying ; and (d) near the north wall of a house. After spraying, pots from each place were placed either in the greenhouse, in sunshine in a garden, or near a north wall. 4 days later, all pots were moved into a garden. In all cases, plants given treatment (c) before spraying, had the largest number of abnormal kernels followed, in most cases, by plants given treatment (b). Plants placed in the greenhouse before treatment had the lowest number of abnormal kernels. From these results it was concluded that light intensity, rather than high temperature, was mainly responsible for the high activity of 2,4-D. —P.J.B.

418 ARNY, D. C. and LEBEN, C. **Control of several small grain diseases by the water soak method.** [Abstract] *Phytopathology* 1954, **44,** No. 9, 481.

In field and greenhouse tests, soaking barley and oat seed in distilled water for 56 hr. at a temperature of 22-4°C. was nearly as effective as seed treatment with Ceresan M for controlling seedling blight caused by *Helminthosporium sativum* and *H. victoriae*. Moderate infestation of barley with loose smut [*Ustilago nuda*] was also effectively controlled by the water treatment. With barley, the soaking treatment tended to reduce germination.—P.J.B.

419 EPSTEIN, E. and LEGGETT, J. E. **The absorption of alkaline earth cations by barley roots : kinetics and mechanism.** *Amer. J. Bot.* 1954, **41,** No. 10, 785-91, bibl. 10, illus. [U.S. Dep. Agric., Beltsville, Md]

Experiments are described on the absorption and mutual interference of alkaline earth cations by excised barley roots. Strontium labelled with Sr^{66} was used. Two modes of uptake are distinguished : (1) exchange adsorption, in which the root acts as a cation exchanger, and (2) active transport of the ions mediated by metabolic processes. The two processes differ in attributes relating to kinetics, reversibility, ion specificity, and energy requirements. In regard to active transport, which constitutes the process of absorption proper, the findings are consistent with the hypothesis that it involves intermediate compound formation between the ions and " binding compounds" or " carriers." The ions Ca, Sr, and Ba compete for identical binding sites or reactive centres on the carriers. The Mg ion does not compete for these sites.—Authors' summary.

420† WIEBE, H. H. and KRAMER, P. J. **Translocation of radioactive isotopes from various regions of roots of barley seedlings.** *Pl.*

Physiol. 1954, **29,** No. 4, 342-8, bibl. 23, illus. [Duke Univ., Durham, N. Carolina, USA]

421 ELLIOTT, Daphne C. **Detection of glycollic acid in etiolated barley shoots.** *J. exp. Bot.* 1954, **5,** No. 15, 353-6, bibl. 9, illus. [Bot. Dep., Univ. Oxford]

A modified method for carboxylic acid analysis has been developed in order to study the metabolism of glycollic acid in barley sap. Glycollic, malic, citric, malonic, succinic, and fumaric acids have been detected in alcoholic extracts from etiolated barley shoots, and the amounts present roughly estimated. —Author's summary.

422 RUSSELL, R. S., and others. **A study of the absorption and utilization of phosphate by young barley plants. 3. The relationship between the external concentration and the absorption of phosphate.** *J. exp. Bot.* 1954, **5,** No. 15, 327-42, bibl. 15, illus. [Dep. Agric., Univ. Oxford]

The absorption of phosphate by young barley plants was studied using a series of solutions ranging in concentration from 0·0003 to over 30 ppm. P. The duration of most of the experiments was 24 hours. The relationship between the external concentration and absorption was found to be sigmoid, the slope of the curve being maximal when the external concentration was in the range of 0·1 to 0·3 ppm. P. It was concluded that the reduction in the slope of the curve, when the external concentration was reduced below 0·1 ppm. P was due to an increasing fraction of the phosphate which entered the plants being retained in metabolic systems in the root, from which it was subsequently released and returned to the outer medium. These results indicate that when the external concentration was lowered below 0·1 ppm. P the plants absorbed progressively decreasing fractions of the nutrient available to them. The significance of this from the viewpoint of the growth of plants under the condition of phosphate shortage is discussed.— Authors' summary.

423 KUDRJAVCEV, V. A. [**The importance of the intensity of light for processes in the formation of generative organs in barley.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **97,** No. 2, 349-52, bibl. 10, illus. [Vorošilovgrad Agric. Inst.]

424 WESSELS, D. G. and PRETORIUS, T. P. **Fertilizer experiments at the Vaalhartz Agricultural Research Station (1946-1950).** *Sci. Bull. 338. Dep. Agric. S. Afr.* 1953, pp. 76, bibl. in text, illus.

Barley, pp. 5-16. Results showed that barley yields were increased by the addition of N fertilizers. Application of 200 lb. ammonium sulphate per morgen [1 morgen = 2·116 ac.] increased the yield 63·1%, while 400 lb. per morgen increased the yield by 140·9%, above that from superphosphate alone. The beneficial effects of N were, however, more marked on the hay yields. 400 lb. superphosphate per morgen was found to be sufficient for good crop yields. Barley showed more response to a phosphate fertilizer than did other crops. Kraal manure produced the greatest increases in yield.—M.P.

MAIZE

425 KHAN, A. R. and MATHUR, B. P. **Studies on tillage. 2. Effect of depth of cultivation on the yield of maize and wheat.** *Indian J. agric. Sci.* 1954, **24,** Pt. 2, 127-32, bibl. 15. [Indian Agric. Res. Inst., New Delhi]

An experiment was carried out in 1949-51, on a well-drained sandy loam (pH 7·9), to determine the effect on yields of maize (summer grown) and wheat (winter grown) of the following ploughing treatments : (a) tractor ploughing 9-10 in. deep ; (b) ploughing 5 in. deep with a bullock-drawn soil-inverting plough, followed by normal cultivation with the local country plough ; (c) ploughing 4-5 in. deep without soil inversion, (d) tractor discing to a depth of 4 in. There were no significant differences in either year between the grain yields of either crop obtained by the different ploughing methods.—W.J.B.

426 CAPUTA, J. Rôle de la culture de maïs-grain dans une exploitation agricole. [**The role of grain-maize cultivation in agriculture.**] *Rev. rom. Agric.* 1954, **10,** No. 12, 95-6, bibl. 4. [Sta. Féd. Essais Agric., Lausanne (Domaine de Changins s/Nyon)]

Switzerland has a relatively small area under maize. Hybrids suitable to French Switzerland are : (1) Wisconsin 270 in the areas round lakes Geneva and Neuchâtel ; (2) Wisconsin 270 and 255 in the Rhone valley area in Canton Valais ; (3) Wisconsin 255 in favourable situations and Wisconsin 240 where more exposed on the plateau at an altitude of 600-650 m.—D.B.

427 LAUBSCHER, F. X. and others. **Maize variety trials in the Highveld region.** *Fmg in S. Afr.* 1954, **29,** No. 335, 129-33 and 143, illus. [Potchefstroom Coll. Agric. and Maize Industr. Control Bd, S. Afr.]

This is the third report on yield trials of maize varieties and hybrids in this region. [Previous reports are noted in *Fld Crop Abstr.* 5 : 750 and 6 : 916.]—G.M.R.

428 SARRIA, D. Estudio descriptivo de cuatro

razas de maíz en Colombia. [**Descriptive study of four maize types in Colombia.**] *Acta Agron., Palmira* 1954, **4,** No. 3, 161-74, bibl. 8, illus., English summary p. 173. [Esta. Agric. Exp. "Tulio Ospina," Medellín, Colombia]

The morphological characteristics and resistance to *Helminthosporium* blight of 112 Colombian maize varieties were observed, and, on the basis of the observations, the varieties were grouped into main types. Four main types, common white, common yellow, Chococito and Pira, are described and their geographical distribution in Colombia mapped.—W.J.B.

429 FINDLEY, W. R. and CAMPBELL, L. E. **Ultrasonic treatments of dormant hybrid corn seed.** *Agron. J.* 1953, **45,** No. 8, 357-8, bibl. 4. [Pl. Industr. Bur., U.S. Dep. Agric., Beltsville, Md]

In trials in which dormant hybrid maize seed was treated with 300 w. of ultrasonic energy at a frequency of 400 k/c. for periods ranging from 1 to 16 minutes, there were significant differences between plants grown from treated seed in certain cases, but these differences were considered to be due to factors other than the treatments. Characters studied included grain yield, percentage of erect plants, plant height, emergence counts and date of silking. Preliminary trials with sprouted seed also failed to show significant differences in effect between treatments.—P.J.B.

430 RABIDEAU, G. S. **Amino acids in the embryo and endosperm of the grain of different varieties of corn.** *Bot. Gaz.* 1954, **115,** No. 4, 391-4, bibl. 10. [Univ. Texas, Austin 12]

An investigation is reported on the distribution of amino acid in seed of 10 varieties of maize which included representatives of flint maize, dent maize and the popcorns. The free amino acids and the amino acids derived by acid hydrolysis were measured, by paper chromatography, in separate samples of endosperm and embryo. With few exceptions, the same amino acids were found in all 10 varieties and were present in the same concentrations. Although in the seed of these maize varieties the endosperm was regularly 8 to 10 times the weight of the embryo, the endosperm consisted of only 15% (by dry weight) of substances which yielded detectable amino acids on hydrolysis, whereas the embryo consisted of 25%. The quantity of amino acid in maize seed is small and similar to the amounts found in range grasses. [See also *Herb. Abstr.* 22 : 960 and 23 : 826, and *Fld Crop Abstr.* 6 : 127.]—D.B.

431 KOEHLER, B. **Some conditions influencing the results from corn seed treatment tests.** *Phytopathology* 1954, **44,** No. 10, 575-83, bibl 29. [Agron. Dep., Univ. Illinois, Urbana]

Different variables which may enter into the technique of conducting seed-treatment tests with fungicides, for the control of seedling diseases of maize, are discussed. They include : seed condition, with particular reference to the effect of pericarp injury on seedling disease and on the benefit derived from seed treatment ; fungicidal dosage ; the use of controlled low temperature and low soil-moisture tests ; the use of field tests. The value of using field tests with commercially-processed seed of widely-grown hybrid strains, subjected to normal sowing-date and sowing-rate practices is emphasized, where it is required to evaluate the benefits that can be expected from the use of seed treatments.—P.J.B.

432 KULASH, W. M. **Growers' trials for control of wireworms attacking corn.** *J. econ. Ent.* 1954, **47,** No. 5, 863-6, bibl. 1. [N.C. Agric. Exp. Sta., Raleigh]

A trial to control wireworms (mainly *Melanotus communis*) on maize showed that Heptachlor was more effective as a soil treatment (100 lb. of 5% dust per ac.) than as a seed dressing (25% wettable powder) for seed sown on untreated soil. The combined soil and seed treatment was not much more effective than soil treatment alone. In another trial spraying in the drill row with Aldrin, Dieldrin or Heptachlor gave some protection but Lindane used in this manner was not effective.—E.B.O.

433 LEIDERMAN, L. Observaçoes sôbre a suscetibilidade de cinco variedades de milho ao ataque de *Heliothis obsoleta* (Fabr. 1793) e *Diatraea* sp. [**Observations on the susceptibility of 5 varieties of maize to *Heliothis obsoleta* and *Diatraea* sp.**] *Biológico, Campinas* 1954, **20,** No. 5, 73-7, bibl. 7. [Inst. Biol., Campinas, Brazil]

The results are reported of replicated experiments in which the susceptibility of the maize varieties Cristal, Armour, Híbrido, Catete and Dôce to *Heliothis obsoleta* (corn earworm) and *Diatraea* sp. (stalk-borer) was tested. The percentage of ears attacked by *Heliothis obsoleta* in the 5 varieties already named (in that order) was 28, 29, 38, 57 and 97, respectively. Corresponding figures for the percentage of plants attacked by *Diatraea* sp. were 26, 34, 34, 43, and 50%, respectively.—W.J.B.

434 AVILA, A. Estudio sobre contenido de caroteno y triptofano en maices comerciales. [**Study of the content of carotene and tryptophane in commercial maize.**] *Rev. Invest. agric., B. Aires* 1952, **6,** No. 3-4, 417-23, bibl. 11, illus. [Inst. Fitotec., Castelar, Argentina] [Received 1954]

The carotene and tryptophane contents of the

grain of 5 varieties of dent maize, 6 varieties of flint maize and one flint × dent cross, were studied. The dent varieties were paler in colour than the flint varieties. The variety with the highest carotene content was Colorado Klein (flint) which contained 8 γ carotene per g. (γ = microgram). Cargil 250 A (dent) had the lowest carotene content (1·62γ per g.). The flint varieties tested contained, as a group, significantly more carotene than the dent varieties. There were no significant differences in the tryptophane content of the different varieties ; it ranged from 0·09 to 0·115%.—W.J.B.

435 STRAUS, J. and LaRUE, C. D. **Maize endosperm tissue grown in vitro. 1. Culture requirements.** *Amer. J. Bot.* 1954, **41,** No. 8, 687-94, bibl. 42, illus. [Univ. Michigan, Ann Arbor]

[See also next abstract.] A tissue derived from the endosperm of maize has been successfully grown in vitro and exhibits the property of unlimited growth. Some of the requirements for the growth of the tissue under culture conditions have been determined. These are : a mineral-salt medium containing 2% sucrose and 0·5% Seitz-filtered yeast extract. An initial pH of 6·1 to 7·0 provides for optimum growth, as does a temperature of 25°C. The tissue is able to utilize starch as the sole exogenous carbon source. The high requirement for yeast extract suggests a high organic nitrogen requirement. Preliminary tests with casein hydrolysate and mixtures of amino acids have shown that the beneficial action of yeast extract may in part be replaced by amino acids. Thus, the extract supplies some substance or substances other than amino acids necessary for the optimum growth of the tissue.—Authors' summary.

436 STRAUS, J. **Maize endosperm tissue grown in vitro 2. Morphology and cytology.** *Amer. J. Bot.* 1954, **41,** No. 10, 833-9, bibl. 34, illus. [Harvard Univ., Cambridge, Mass.]

[See also previous abstract.]

437 NIRODI, N. **Studies on some Asiatic relatives of maize.** *Diss. Abstr.* 1954, **14,** No. 10, 1513. [Washington Univ.]

The genera considered include : *Coix*, *Chionachne* and *Polytoca* and, in these genera, the following taxa : *Coix poilanei* Mimeur, *C. lachryma jobi* var. *typica* Watt, *C. gigantea* Koen. ex Roxb., *Polytoca macrophylla* Benth. and *Chionachne koenigii* (Sprengel) Thwaites. It is concluded that of these three genera, *Coix* is closest to the New World Maydeae and that *Polytoca* and *Chionachne* are closer to one another than to either *Coix* or to the Maydeae.—P.J.B.

438 WESSELS, D. G. and PRETORIUS, T. P. **Fertilizer experiments at the Vaalhartz Agricultural Research Station (1946-1950).** *Sci. Bull. 338. Dep. Agric. S. Afr.* 1953, pp. 76, bibl. in text, illus.

Maize, pp. 5-20, 26-35. Nitrogenous and phosphate fertilizers increased maize yields, and there appeared to be no antagonistic effects between them. Summer crops with no fertilizers reacted better than winter crops to superphosphate added at the rate of 800 lb. per morgen [1 morgen = 2·116 ac.], but this may have been a residual effect from treatments to previous crops. Similarly with maize grown on lucerne lands, yields were unexpectedly high, and the different treatments produced no significantly different yields. Residual N effects were also obtained from top-dressing experiments carried out on the previous wheat crop. The addition of kraal manure resulted in very good yields. High N gave high protein content, but the phosphate and calcium contents of the grain did not alter significantly.—M.P.

439 THOMPSON, H. J. and SHEDD, C. K. **Equilibrium moisture and heat of vaporization of shelled corn and wheat.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 11, 786-8. [Iowa Agric. Exp. Sta., Ames]

Determinations were made of the moisture content (wet basis) of maize and wheat grains that had come to moisture equilibrium in atmospheres of various constant humidities (range of R.H. tested 35-83%), at 4 constant temperatures (20°, 32°, 50° and 70°F.). Results showed that : (a) other factors remaining constant, a 7% rise in R.H. raises the moisture content by about 1% ; (b) a 50°F. drop in temperature increases the moisture content by about 2% ; (c) pre-drying to 8% moisture decreases the equilibrium moisture content by 0·5-0·8% in comparison with samples premoistened to 16% moisture ; (d) as grain moisture content increases, the value of heat of vaporization approaches that for free water.—E.B.O.

440 SWAINE, G. **Underground storage of maize in Tanganyika.** *E. Afr. agric. J.* 1954, **20,** No. 2, 122-8, bibl. 6, illus. [Dep. Agric. Tanganyika]

An account is given of trials on the long-term storage of maize in underground pits in Tanganyika. The storage periods in the three 120-ton pits constructed at Morogoro, Dodoma and Moshi were 379, 446 and 466 days, respectively. The details of construction, methods of sealing the pits, the techniques and results of sampling are given and the difficulties encountered are described. The weevil (*Calandra oryzae*) population was eliminated by accumulation of respiratory carbon dioxide. Leakage of this gas in one pit resulted in some of the flour beetles (*Tribolium castaneum*) remaining alive. The maize at the end of the trials

was in a very satisfactory condition. Construc-tional costs for underground pits are less than those for godowns holding the same quantity of grain.—From author's summary.

441 ITALY. Istituto di Tecnica Agraria "N. Strampelli", Lonigo. Atti del 1° Congresso Nazionale dei Mais Ibridi, Vicenza, 21 Febbraio 1954. [**Proceedings of the 1st National Congress on Hybrid Maize, Vicenza, 21st February, 1954.**] *Genet. agr.* 1954, **4,** No. 3-4, 181-422.

In 14 papers delivered at the Congress, trials with hybrid maize in different regions of Italy are described, and various aspects of growing hybrid maize in that country are examined. Rules for irrigating hybrid maize. By C. Monestiroli, pp. 368-71. At the Istituto Sperimentale Agrario, Cremona, hybrid maize irrigated 3 times, i.e. at the beginning of : tasselling, fertilization (1-15 July) and grain formation, the irrigation water being given in alternate furrows, yielded about 8400 kg. of grain per ha., as against less than 6000 kg. when irrigation was given only twice.—E.B.O.

SWEET-CORN

442 LUKENS, H. C. and others. **Color-moisture relations of yellow sweet corn.** *Proc. Ass. off. agric. Chem.* 1954, **37,** No. 2, 489-99, bibl. 7, illus. [Bur. Agric. Industr. Chem., U.S. Dep. Agric.]

There were definite and reproducible relationships between the colour of yellow sweet-corn and its moisture content, which were considered to offer a means of indicating the stage of maturity of sweet-corn. A description is given of an experimental photo-electric photometer adapted for measuring the excitation purity of colour of sweet-corn.—P.J.B.

MILLETS AND SORGHUM

443 COETZEE, P. J. S. **Production of kaffircorn.** *Fmg in S. Afr.* 1954, **29,** No. 341, 358-62 and 365, bibl. 8, illus.

The cultivation, harvesting, grading and uses of kaffircorn in South Africa are outlined. The pests and diseases attacking this sorghum and the effects of the crop on the soil are briefly dealt with. A description is given of the varieties Radar, Martin, Hegari and Birdproof.—M.P.

444 KARPER, R. E. **Registration of sorghum varieties, VII.** *Agron. J.* 1954, **46,** No. 11, 526-7. [Texas Agric. Exp. Sta., College Station]

Descriptions are given of Redlan, Dwarf Kafir 44-14 and Darset (Reg. Nos. 102-104, respectively). Redlan is a kafir-like type selected from a cross between kafir × milo (C.I. 1090) and Blackhull kafir (C.I. 71). It is a long-season variety, adapted to combine harvesting in the region to the east of that in which milo is grown. Dwarf kafir 44-14 is a dwarf, white-seeded combine-type variety, selected from a cross between Sharon kafir and an early dwarf feterita selection. It is a long-season variety. Darset was developed in an attempt to produce a combine-type grain sorghum with resistance to birds and to weathering. It is a double-dwarf type in height and was selected from a hybrid between a Darso-like sorghum strain and Oklahoma No. 1 Darso. The seed of Darset resembles that of Darso in appearance and the possession of the tannin-like substance in the seed-coat, from which its resistance to birds and weathering is derived. It is intended for growing primarily in those regions where Darso has hitherto been the best variety.—P.J.B.

445† THURMAN, R. L. and NESTLER, R. P. **Results of three sorgo trials conducted in Arkansas in 1953.** *Agron. J.* 1954, **46,** No. 9, 431-2. [Univ. Arkansas, Fayetteville]

Data are given of the correlations between the fresh-weight yields of the sorgo varieties Sart, Tracy, White African, Atlas and Orange and a number of other agronomic characters. The fresh-weight yields of these varieties, in the order given, grown at 3 locations in Arkansas averaged 19·69, 18·49, 17·21, 11·35 and 11·14 tons per ac., respectively. The mean percentage of stalk weight in the total yield ranged from 71·6 to 81·7 and showed a high significant positive correlation with fresh weight. The fresh-weight yield of leaves + heads ranged from 3·14 to 3·81 tons per ac. and did not differ significantly between varieties. The average protein content of the stalks, leaves and heads was 2·89, 7·61 and 10·15% in 2 varieties grown at one location ; varieties producing low fresh-weight yields had the highest protein contents. The total solids (Brix) readings of the expressed juice of the varieties showed a high significant positive correlation with fresh weight yields. Analysis of variance of percentage of dry weight showed significant differences among varieties and locations and significant interactions between varieties and locations.—P.J.B.

446 SACCAS, A. M. Les champignons parasites des sorghos (*Sorghum vulgare*) et des pénicillaires (*Pennisetum typhoideum*) en Afrique équatoriale française. [**The fungi parasitizing sorghum (*Sorghum vulgare*) and pearl millet (*Pennisetum typhoideum*) in French Equatorial Africa.**] *Agron. trop.,*

Nogent 1954, **9,** No. 6, 647-86, bibl. 265, illus. [Sta. Cent. Boukoko, Afr. Equat. Fr.]
[See Abs. 90.]

447 KANDIAH, S. and RODRIGO, D. M. **Evidence of magnesium deficiency in Ceylon soils.** *Trop. Agriculturist* 1954, **110,** No. 1, 21-4, bibl. 2.

Signs of Mg deficiency have been observed in plants growing on the lateritic soils of the Wet Zone and on the sandy soils of the Dry Zone of Ceylon. Chemical analyses of the leaves of healthy sorghum and maize plants and of the leaves of plants showing symptoms of Mg deficiency are tabulated. The percentage Mg in the leaves of healthy and diseased sorghum was 0·6 and 0·33%, respectively: corresponding figures for maize (growing on a soil generally deficient in plant nutrients) were 0·39 and 0·13%.—W.J.B.

RICE

448 RAMIAH, K. **Factors affecting rice production. A summary of replies to a questionnaire of the International Rice Commission.** *Agric. Devel. Pap. 45. F.A.O.* 1954, pp. 45.

Factors affecting the yield of rice are reviewed, including: latitude, temperature, day-length, altitude, growing season, soil conditions, water supply, cultivation practices, manurial treatments, crop rotations, varieties, pests and diseases. Rice yields appear to be highest in warm temperate regions, where temperatures not below 70°F. and long days, with intense insolation during the growing period, favour the physiological activity of the rice plant. It was not established whether altitude affected rice yields. There was evidence that in tropical countries, rice gave higher yields in the dry season under strong insolation, than in the cloudy, monsoon season, irrespective of temperature. Manurial treatment applied during the monsoon season appeared to increase vegetative growth at the expense of grain yields. It is inferred that the high yields obtained in such warm temperate countries as Italy, Korea, Spain and Japan are due to a retardation in vegetative development and of the flowering phase; this response is found only in *Oryza sativa* var. *japonica* strains. Heavy soils, but not those completely impervious, appear optimum for rice growth, as do neutral to slightly acid soil conditions. The question of broadcasting seed versus transplanting is reviewed. It is stated that attempts to increase rice production in the tropics must include the introduction of the practice of transplanting, where this is not already done. In the case of certain early-maturing varieties in India and Ceylon, the yields of broadcast rice have occasionally equalled those of transplanted rice, but this has been done only by careful soil preparation and thorough control of weeds. The importance of an increased use of improved varieties in the tropics, combined with proper manurial practices to exploit their full potential, is stressed. Maximum yields are obtained from 5-month varieties, but there are indications that equally high yields can be obtained from varieties with a shorter growing period; also, that coarse-grained varieties yield better than fine-grained varieties. A tabulated summary is given of basic information on rice production in different countries and in provinces of India and Pakistan.—P.J.B.

449 MALAYA Department of Agriculture. **Notes on current investigations, agronomy. April to June 1954. Green manures.** *Malay. agric. J.* 1954, **37,** No. 3, 185.

Trials with green manures for rice cultivation in Kedah are reported briefly. *Sesbania aculeata* was the most promising species tried. Its seed germinated rapidly and it was able to withstand drought and flood. *S. aculeata* reached a height of 3·5 ft. in 2 months.—W.J.B.

450 PIACCO, R. Risi italiani e risi americani. [**Italian and American rice varieties.**] *Riso* 1954, **3,** No. 11, 10-14, bibl. 8, illus. [Sta. Sper. Risicolt., Vercelli, Italy]

The rice varieties grown in the USA are compared, from a commercial standpoint, with the varieties grown in Italy. The following are the main differences noted. In Italy there are some semi-high-quality varieties, mainly the Maratelli, belonging to the proles *japonica* which have a grain of medium weight, almost round in shape. This type is absent in the USA where varieties belonging to the proles *indica,* which have a very slender grain, are found. The latter are not found in Italy. —E.B.O.

451 NILES, J. J. **Use of triphenyl tetrazolium bromide in viability tests of rice seed.** *Trop. Agriculturist* 1954, **110,** No. 1, 13-20, bibl. 9, illus. [Ceylon]

Techniques for using triphenyl tetrazolium bromide as a means for estimating the percentage germination of rice seeds were studied and the correlation between the percentage germination estimated in this way and the actual percentage germination of numerous samples, ascertained by the usual tests, was determined. For the purpose of the study of techniques, rice seed with an actual germination percentage of 98·3% was dehusked and pre-soaked for 16 hr. in water at 25°C. before being bisected and placed with cut surfaces upwards in Petri dishes. Tetrazolium solutions, at concentrations of 0·1%, 0·5% and 1%, were applied to the longitudinally bisected seeds for staining periods of 15, 30, 60, 120 and 240 min.

Any seed in which the plumule and radicle, half the scutellum and the region between the plumule and radicle were all stained with red triphenyl formazan as a result of the reduction of the tetrazolium by living cells, was considered viable. After a staining period of 60 min., a percentage of viable seeds, as indicated by staining, closely corresponding with the actual percentage germination, was obtained only where 1% solution was used. After 240 min. staining, the percentage of viable seeds (the percentage of seeds stained) corresponded closely with the actual percentage germination at all 3 concentrations of tetrazolium. The correlation between the percentage of seeds stained and actual germination percentage was determined in an experiment in which rice seeds from samples of 6 rice varieties were tested for germination, both by the normal method and by the use of tetrazolium applied (using the technique already described) to seeds for 240 min. at a concentration of 0·1%. The correlation coefficient between the results obtained using the tetrazolium and the normal method was almost complete (0·994). The tetrazolium test was also applied to dormant seed in an experiment in which seeds were tested by the normal method and by tetrazolium staining at intervals of one week after harvest. The tetrazolium test gave a result, in the case of the variety Djalen, of 100% germination throughout the experiment ; the normal method gave a percentage of 21·7 shortly after harvest (when the seeds were mostly dormant), 83·3% 2 weeks after harvest, and 100% 1 month after harvest when dormancy had expired. Thus the tetrazolium test can be used for the determination of viability in dormant seed at a time when the normal tests are of little value. An advantage of the tetrazolium test over the normal method for determining percentage germination is the simplicity of the equipment required.—W.J.B.

452 HENDERSON, S. M. **The causes and characteristics of rice checking [cracking].** *Rice J.* 1954, **57,** No.5, 16 and 18, illus. [Agric. Engng Dep., Univ. California, Davis]

Data are given on the effect of different drying procedures on the percentage of cracked kernels in rice grain. The results indicated that grain cracking appeared to be caused by a high rate of increase in either the moisture content of the grain, or in drying temperatures. Such conditions as intense sunshine, or a rapid increase in moisture content under conditions of heavy dew, were also thought to cause cracking. Under conditions of high grain-drying temperatures, cracking appeared to be caused by heat, alone, and not by a decrease in the moisture content of the outer layers of the grain. Recommended procedures, aimed at securing a high yield of head rice and low percentages of cracked grain, included : (a) harvesting grain at a high moisture content, before the grain is subjected to moisture and heating cycles in the field, (b) drying at the lowest possible temperatures, (c) using as many drying cycles as possible to reduce grain temperature gradients.—P.J.B.

453 HOGAN, J. T. and others. **Cereal quality measurement. X-ray and photomicrographic examination of rice.** *J. agric. fd Chem.* 1954, **2,** No. 24, 1235-9, bibl. 10, illus. [South. Reg. Res. Lab., New Orleans, La]

The results are given of studies on the use of X-rays for examining unhulled rice for internal cracks and immature kernels. The use of X-ray examinations is thought to have value for investigating kernel cracking caused by harvesting and drying techniques. X-rays were able to reveal the presence of breaks and large cracks, though it was thought that relatively minor cracks could not be detected by this method. Notes are given on seed-sectioning techniques, adapted from those used with other types of grain, suitable for showing the internal structure of the rice kernel.—P.J.B.

454 FOURY, A. and others. Espèces adventices des rizières du Rharb. [**Weeds of rice-fields in the Rharb.**] *Terre maroc.* 1954, **28,** No. 300, 409-11.

Lists are given of weed species found in rice-fields in the Rharb, Morocco, with notes on the most noxious ones. Most species were present in this region before drainage and are now spreading with the extension of the rice-area. Three zones are distinguished : (a) summit of the dikes ; (b) moist edges of the dikes ; (c) interior of rice-fields. Some species are found in more than one zone. In zone 2 and 3 about 25 weed species are present, of which the following are noxious : *Echinochloa crus-galli, Polygonum lapathifolium, Paspalum distichum, Scirpus maritimus, Typha latifolia* and *Phragmites communis.*—E.B.O.

455 CIFERRI, R. Ammaestramenti tratti dal diserbo chimico selettivo fitormonico. [**Advice derived from selective chemical weed-killing.**] *Riso* 1954, **3,** No. 7, 11-12 ; No. 8, 5-7 ; No. 9, 12-14, illus.

Damage to rice crops has been reported throughout the Po Valley, Italy, in 1953 following treatment with 2,4-D, which was employed at rates of about 0·7-1·75 kg. of acid equivalent per ha. This damage is thought to be related to low temperatures and high humidities during April-May and to other particular conditions, such as growing rice on newly-ploughed grassland, or after a heavy application of farm-yard manure. No damage to rice crops was reported from treatment with MCPA which, however, is less effective than 2,4-D.—E.B.O.

456 Rice Journal. **New chemical released for control of white tip [of rice].** *Rice J.* 1953, **56,** No. 12, 13.

A note is given on white tip nematode disease of rice. Varieties classified as resistant to the disease include : Arkansas Fortuna, Nira 43, Bluebonnet, Improved Bluebonnet, Century 231 and Century 52. A new chemical, 3-p-chlorophenyl-5-methyl rhodanine, applied as a seed dressing at a rate of 1 oz. of a 40% formulation per bu. of seed, is reported to give effective control.—P.J.B.

457 Todd, E. H. and Beachell, H. M. **Straighthead of rice as influenced by varieties and irrigation practices.** *Rice J.* 1954, **57,** No. 6, 20-2, bibl. 4. [Texas Agric. Exp. Sta., College Station]

Straighthead is a non-parasitic disease of rice. Its symptoms include the presence of relatively large, shallow roots, with few branches and root hairs, leaves and culms which are usually dark green and rigid, and an erect panicle with malformed florets. The condition can commonly be controlled by draining the field before panicle development, so as to allow the soil to dry and become aerated. In trials, the incidence of straighthead on an area continuously flooded during the growing season averaged a value of 9 on a scale 1 to 10, compared with 2·7 on a similar area aerated during the seaon. These values were obtained where varieties susceptible to straighthead were used ; where resistant varieties were used, values averaged 3·3 and 0·8, respectively. Resistant varieties included Century Patna, Bluebonnet 50 and a selection B455A1-25 from Bluebonnet × (TP × R-SER). The soil used was a Hockley fine sandy loam ; in similar trials on Lake Charles clay loam, no straighthead was observed.—P.J.B.

458 Wada, K. **Observations on the occurrence of highly-numbered vascular bundles in coleoptile of rice plant.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1954, **23,** No. 1, 6-9, bibl. 2, English summary p. 9. [Fac. Agric., Tohoku Univ.]

Rice grain obtained from rice plants (of the same strain) growing under different environmental conditions was germinated and the number of vascular bundles in the coleoptiles was determined. P-deficiency in the soil in which the plants were grown gave rise to larger numbers of vascular bundles than N-deficiency. Growing the plants with long days gave greater numbers than growing with short days. Cutting out portions of the leaves after heading caused an increase in the number of vascular bundles. Application to the soil in which the plants were grown of Fratol (sodium salt of monofluoracetic acid) and 2,4-D caused an increase in the number.—From English summary.

459 Ghose, R. L. M. and Shastry, S. V. S. **Response of rice varieties to short-day treatment.** *Euphytica* 1954, **3,** No. 3, 221-8, bibl. 8. [Cent. Rice Res. Inst., Cuttack, India]

In trials during 1951 and 1952 at Cuttack, 30-day-old seedlings of 50 *indica* and *japonica* rice varieties were subjected to 8 hr. photoperiods for 20 days. The *japonica* varieties flowered within 55 to 85 days after sowing and the *indica* varieties within 76 to 182 days, under normal conditions at Cuttack. All varieties responded to the photoperiodic treatment, the response in terms of shortening the period between sowing and flowering being small in the case of early-maturing and large in the case of late-maturing varieties. The regression of photoperiodic response on the normal length of the period between sowing and flowering for all monthly sowings, except those made in August, did not differ significantly from the value 1·0. Varieties subjected to the short-day treatments after being sown in March took an average of 64·1 days to flower, compared with 90·7 days when they were sown in November.—P.J.B.

460 Fukaki, S. **The investigation on the tillering of rice plant (*Oryza sativa*). 4. The influence of various degrees of day length and light intensity on the tillering of the rice, wheat and barley plants, with the consideration of some other factors.** [Japanese] *Tec. Bull. Kagawa agric. Coll.* 1954, **5,** No. 3(Serial No. 15), 223-42, English summary pp. 241-2.

461 Mori, T. **Studies of ecological characters of rice root. 1. Effect of hydrogen sulphide on root growth and rice plant.** [Japanese] *Bull. Inst. agric. Res., Tôhoku* 1954, **6,** No. 1, 1-18, bibl. 11, illus., English summary pp. 13-14.

Rice plants were grown in a culture solution to which a constant volume of water saturated with H_2S was added. The sensibility of the roots to damage by H_2S varied according to age and tissue type. In general, the greatest injury caused by H_2S occurred in the tissues in which metabolic activity was greatest.—W.J.B.

462 Kumar, K. and others. **Effect of sulphadrugs on growth yield and quality of paddy.** *Sci. and Cult.* 1954, **20,** No. 1, 36-8, bibl. 1.

A study was made of the effect of applying to rice plants [date and method of application not given] Sulphamerazine, Sulphadiazine, Sulphaguanidine, Sulphathiazole and Sulphanilamide, in concentrations of 1, 10, 30 and 50 ppm., on the following characteristics : height of the main shoot, number of tillers at 3 stages of the life-cycle (35, 50 and 80 days after transplanting), earhead characteristics, yield of grain, weight of shoot and root, and chemical composition of the grain. The results are

tabulated. Eighty days after transplanting, Sulphathiazole gave the greatest plant-height while Sulphanilamide reduced plant-height significantly below the level of the untreated control plants. In general, responses to 1 and 10 ppm. sulpha drugs were better than responses to more concentrated doses. Sulphadiazine, Sulphathiazole and Sulphamerazine all significantly increased yield of grain per plant, compared with the control plants. The contents of N, S, P_2O_5 and K_2O in the grain were variously affected by the different drugs. All drugs, compared with the controls, increased the P_2O_5 content in the grain. Sulphanilamide depressed the yield of roots per plant, compared with the controls.—W.J.B.

463 NARASINGA RAO, M. B. V. **Manurial trials with ammonium sulphate on ryots' fields in the Madras State.** *Madras agric. J.* 1954, **41,** No. 6, 165-71. [Agric. Res. Inst., Coimbatore]

Manurial trials with rice, carried out in 1950-1 on farms in numerous irrigated districts in Madras State, are described. Ammonium sulphate was applied at 100 and 150 lb. per ac. 4 and 6 weeks after transplanting. There were no significant differences between the yields obtained from the 2 different application dates. In general, 100 lb. ammonium sulphate gave an increased yield of about 260 lb. grain per ac. The additional grain yields obtained by applying 150 lb. per ac. of ammonium sulphate were variable. The yields of the control plots (no ammonium sulphate) were generally in the region of 2000-2500 lb. grain per ac.—W.J.B.

464 HAYNES, D. W. M. **The use of self-propelled combine harvesters for the harvesting of wet padi in the North Kedah plain.** *Malay. agric. J.* 1954, **37,** No. 2, 68-90, bibl. 8, illus.

Under average conditions, there was little difference between the cost of mechanical and hand harvesting.—W.J.B.

465 NARAYANA RAO, M. and others. **Effect of storage on the chemical composition of husked, undermilled and milled rice.** *J. Sci. Fd Agric.* 1954, **5,** No. 9, 405-9, bibl. 15, illus. [Cent. Fd Technol. Res. Inst., Mysore, India]

Raw husked rice, raw undermilled rice, parboiled rice and raw milled rice were stored in gunny bags for one year. The amylase activity of stored, freshly harvested rice decreased rapidly, and thiamine loss was 20-30% in all but parboiled undermilled rice. A decrease in N soluble in 3% sodium chloride occurred indicating denaturation of the protein. The acidity and peroxide value of the fat present increased. The safe storage periods for the various samples stored at 72-91°F. and 35-80% relative humidity were estimated at : raw husked rice, 7 months ; raw undermilled rice, 12 months ; parboiled rice, 11 months ; and raw milled rice, 13 months.—M.P.

466 SCHUSTER, W. **Fish culture in conjunction with rice cultivation. 1.** *World Crops* 1955, **7,** No. 1, 11-14, illus. [FAO]

GENERAL

467 MALMUS. Stimmen die Aussaatstärken ? [**Are (cereal) seeding rates correct ?**] *Dtsch. landw. Pr.* 1954, **77,** No. 21, 297. [Herzberg/Harz, Germany]

Results of rate-of-seeding experiments demonstrate that in the case of cereals 200 kg./ha., the rate practised by farmers in the uplands of Hesse and the foothills of the Harz mountains, is too high and that better returns are obtained from 80 to 100 kg./ha.—D.B.

468 BLACKMON, C. R. and SNELL, R. S. **Effect of spacing in winter versus spring grain companion crops and its relation to nitrogen fertilization of the spring type.** *Agron. J.* 1954, **46,** No. 11, 489-91, bibl. 7. [Rutgers Univ.]

In trials during 1951 and '52, Thorne winter wheat was sown in rows 7 in., 7 in. alternating with 14 in., and in rows 14 in. apart in mid-October, 1951, and late September, 1952. Sowing rates for the 3 row-spacing treatments were 2, 1·3 and 1 bu. per ac., respectively. Timothy [*Phleum pratense*] was sown at 6 lb. per ac. with the wheat and Kenland red clover was sown at 8 lb. per ac. in the following March. Autumn applications of 20 or 40 lb. N were made at the time of sowing, without, or combined with, spring top-dressings of 30 lb. N per ac. Average grain yields in 1952-3 were 34·8 bu. from the alternate spacings and were significantly higher than the 32·5 and 28·4 bu. per ac. obtained where 7 and 14 in. row spacings, respectively, were used. Straw yields followed similar trends. Spring top-dressings of 30 lb. N per ac. significantly increased grain yields at all row spacings, with average increases of 3·2, 5·8 and 7·1 bu. per ac. for 7 in., 14 in. and 7 + 14 in. row spacings, respectively. The spring N treatment increased tillering by an average of 24%. Red-clover plant-stands did not differ significantly between the different cereal row-spacings, though stands were highest where the 14 in. row-spacing was used. In trials with Clinton spring oats in 1951, '52 and '53, similar row-spacings were used, with sowing rates of 9, 6 and 4·5 pecks per ac. Buffalo lucerne was sown with the oats at 12 lb. per ac. Manurial treatments were 500 lb. 5-10-10 (NPK) per ac. broadcast + 500 lb. 4-12-8 drilled with the oat seed. Average grain

yields of oats grown in rows spaced 7, 7 + 14 and 14 in. apart were 46·5, 35·2 and 29·5 bu. per ac., with straw yields of 2997, 2562 and 1986 lb. per ac., and average lucerne stands of 67·6, 77 and 83·6 plants per 9 sq. ft. area, respectively. The relatively more favourable yield response of winter wheat than spring oats to 14 in. row spacing was attributable to the greater tillering in the former. From these results, it was concluded that where winter wheat was used as a companion crop to forage crops, alternate 7 and 14 in. spacing was superior to the 7 in. spacing commonly used. High N applications in the autumn did not increase winter-wheat yields ; small rates of application of about 20 lb. at this time were considered sufficient to ensure good establishment.—P.J.B.

469 THOMAS, I. and REEVES, J. **New cereal varieties in Australia.** *J. Dep. Agric. W. Aust.* 1954, **3,** No. 5, 510.

Particulars are given of the wheat variety Sherpa, the oat varieties Bovah and Acacia and the flax variety Ventnor.—M.P.

470 HORE, H. L., and SIMS, H. J. **Recommended cereal varieties.** *J. Dep. Agric. Vict.* 1954, **52,** No. 3, 117-25, illus.

471† TONIOLO, L. and BENI, G. L'impiego del tetrazolo nel controllo della germinabilità delle cariossidi di alcuni cereali. [**The use of tetrazolium chloride for determining the germinating capacity of some cereal seeds.**] *Ann. Sper. agr.* 1954, **8,** No. 6, 1975-88, bibl. 36. [Ist. Agron. Univ. Padova, Italy]

In trials with rye, wheat, barley and oat seeds, the TTC test gave accurate results only for seeds of high viability. The bibliography gives references to works published after 1949.—E.B.O.

472 GREAT BRITAIN. National Institute of Agricultural Botany. **Seed Notes No. 50.** *Seed Prod. Cttee NIAB* 1954, pp. 12.

The provisional results are given of the 1954 cereal seed-crop inspection scheme.—M.P.

473 WUNDERLICH, G. Ergebnisse experimenteller Untersuchungen über den Ausfall des Getreides. [**Results of experimental investigations on seed shedding in cereals.**] *Ber. Arbtag. Bundesanst. alp Landw., Admont* 1954, 158-77, bibl. 9.

The term " Ausfall " is defined. The factors which influence this grain shedding are briefly mentioned. They include the compactness of the ears, presence or absence of awns, character of the glumes and their attachment, brittleness of the rachis, stage of maturity of the grain, moisture content of the air, and the action of wind on the decomposing straw and glumes. The cause of grain shedding in barley, oat, rye and wheat is given ; it varies from one species to another. Methods for determining the degree of shedding are mentioned and some records are given of the occurrence of grain shedding in cereal varieties in Austria.—D.B.

474 HÄNSEL, H. Winterfestigkeit und die Methoden ihrer Überpüfung bei Getreide. [**Winterhardiness and methods for testing it in cereals.**] *Ber. Arbtag. Bundesanst. alp. Landw., Admont* 1954, 96-136, bibl. 58.

This literature review, though concerned with breeding for winterhardiness, also gives cultivation measures for improving winterhardiness and discusses those properties by which it can be tested. The cultivation measures are : (1) sowing in moist, loose soil ; (2) manuring with P and K ; and (3) adjusting the date of sowing so that the plant overwinters in the 5-leaf stage at which cold resistance is at its maximum. These measures are said to be uncertain ways for increasing winterhardiness because of the vagaries of weather. The testing of winterhardiness is based on those plant characteristics which are associated with winterhardiness, viz : growth type, especially the erectness of the leaves ; depth of the tiller bud below ground ; strength, position and number of seedling roots ; cold requirement ; photoperiodic behaviour ; the course of cold resistance during the winter half-year ; and the possibility of vernalization at temperatures below freezing point.—D.B.

475 DEVOR, A. W. **Cereal carbohydrate determination. Sulfonated 1-naphthol and anthrone reactions applied to sulfuric acid extract of cereals.** *J. agric. fd Chem.* 1954, **2,** No. 25, 1290-2, bibl. 9. [Physiol. Chem. Dep., Ohio State Univ., Columbus]

Procedures are given for carrying out simple, direct estimations of the carbohydrate content of 1·25% H_2SO_4 nitrogen-free extracts, obtained during determinations of crude fibre content.—P.J.B.

LEGUMES

COWPEAS

476 HOOVER, M. W. and DENNISON, R. A. **A study of certain biochemical changes occurring in the southern pea, *Vigna sinensis*, at six stages of maturity.** *Proc. Amer. Soc. hort. Sci.* 1954, **63,** 402-8, bibl. 9, illus. [Florida Agric. Exp. Sta., Gainesville]

The studies reported were made to determine changes in the moisture, protein, alcohol-insoluble solids, starch, total and reducing sugar contents of the seeds of *V. sinensis* at 6 stages of maturity and to determine the correlations between the values found and stage of maturity. Moisture content decreased from 82·8% at the first stage of maturity,

› 57·5% at the 6th stage of maturity. The develop-ıent of the seed appeared to be characterized by a ıpid increase in the alcohol-insoluble solids, rincipally starch, and a decrease in the protein-nd sugar-content. Very little reducing sugar was ›und in the seed, except at the very earliest stages f maturity.—P.J.B.

OYABEANS

77 MACKIEWICZ, Z. Terminy siewu soi w Polsce. **Time of sowing soybeans in Poland.** *Rocz. Nauk Roln. Ser. A* 1954, **69,** No. 2, 295.

78 NEILL, J. C. **Effects of artificial hail on soybeans.** *Diss. Abstr.* 1954, **14,** No. 10, 1493. [Univ. Illinois]

ı trials during 1949-51, soyabeans were subjected › simulated hail injury at 5 stages of maturity in 949 and at 10 stages in 1950 and 1951. Several egrees of injury were inflicted at each stage of ıaturity. Grain yields were reduced most by injury ıflicted during the early stages of seed develop-ıent. Injury inflicted when the plants were small, ıused progressively greater reductions in seed ield up to the time of seed development ; yield ›ductions progressively lessened following injury ter the seed development stage. Injury at early owth stages delayed maturation by up to one eek ; injury at the late-flowering, or early pod ages, had little effect on maturity, while injury ter this stage tended to hasten maturity. Seed rmination was reduced by injury during the seed evelopment stages. The oil content of the seed as consistently reduced by medium to heavy egrees of injury at the green-bean stage. Terminal ıd loss was a good quantitative index of the over-l injury sustained by the plants. The greatest eld reduction per unit of bud loss was caused by jury at the early podding stage and the least when e plants had 3-4 trifoliate leaves. [See also *Fld rop Abstr.* 7 : 737.]—P.J.B.

79 SOYBEAN DIGEST. **Two new [soyabean] varieties for the North. Norchief and Chippewa promise early maturity.** *Soybean Dig.* 1954, **15,** No. 1, 16-17, illus.

›rchief is adapted to the north-central zones of innesota, Wisconsin and Michigan, an area tending through the southern part of the zone ıere Flambeau is grown and much of the ea is devoted to Mandarin (Ottawa) and pital. It matures about 5 days earlier than pital and Mandarin and about 3 days later than ambeau. In trials during 1950-3, the yields of ›rchief, Flambeau, Capital and Mandarin aver-ed 29·7, 25·5, 30·7 and 30·7 bu. per ac., with a d-oil content of 19·7, 18·6, 19·8 and 19·1%, spectively. Chippewa is adapted to the south-central zones of Minnesota, Wisconsin and Michigan and the extreme north of Iowa, i.e. to the northern part of the zone to which Blackhawk is adapted and where Mandarin and Capital are commonly grown. Chippewa is about 5 days earlier than Blackhawk and is of particular value to areas where Blackhawk is too late in maturing. In trials during 1949-53, Chippewa, Mandarin and Blackhawk gave average seed yields of 29·7, 26·6 and 29·4 bu. per ac., with an oil content of 20·3, 19·4 and 20·4%, respectively. Both Norchief and Chippewa will be released to growers in 1956.—P.J.B.

480 MACKIEWICZ, Z. Porównanie odmian soi w latach 1947-51 w Bydgoszczy i Minikowie. **Comparison of soybean varieties.** *Rocz. Nauk roln. Ser. A* 1954, **69,** No. 2, 292-4.

481 SOUTHERN RHODESIA. Grasslands Agricultural Research Station, Marandellas. **Annual Report for the year ending 30th September, 1953.** *Rep. Fed. Minist. Agric. S. Rhod.* [n.d.], 18-20, bibl. 7. [Received Aug., 1954]

In trace-element and fertilizer trials with soyabeans, the compounds were applied at sowing. Some seeds were inoculated before sowing with cultures from the Waite Institute, Australia. Inoculations resulted in an increase in : (a) mean dry-matter yield of beans from 375 lb. to 940 lb. per ac. ; (b) mean hay-yield from 1100 lb. to 1900 lb. dry matter per ac. at 20 weeks ; (c) mean crude-protein content of the hay from 9·9% to 14·7% ; (d) the N content of the beans ; (e) nodulation, there being 120 nodules per inoculated plant as compared with 1 per uninoculated plant at 16 weeks ; and (f) weight per nodule (four-fold increase). Zinc sulphate and ammonium sulphate tended to reduce the beneficial effects of inoculation. Lime increased nodulation but had no apparent effect on bean and fodder-yields. Manganese sulphate increased the mean bean-yield of inoculated plants by 40%.—M.P.

482 HOWELL, R. W. **Phosphorus nutrition of soybeans.** *Pl. Physiol.* 1954, **29,** No. 5, 477-83, bibl. 18, illus. [U.S. Reg. Soybean Lab., Urbana, Illinois]

The effect of the level of P in the nutrient solution on several agronomic and chemical characteristics of soyabeans was studied. The relative growth of plants on 2 and 10 ppm. P and the characteristic appearance of leaves of plants suffering from P deficiency are illustrated. It was found that increase in the P level from 2 to 10 ppm. resulted in taller and heavier plants, greater yield, and a higher oil content in the beans of all of the varieties used. A marked difference in varietal response was observed when a wider range of P levels was provided. The variety Chief continued to respond favourably to P levels as high as 112 ppm. whereas,

the varieties Lincoln and Illini were adversely affected by levels of 50 and 112 ppm. There was little or no effect of the P level on the number of days to blooming.—Author's summary.

GROUNDNUTS

483 GALLAND, P. and MARTIN, G. Culture mécanisée de l'arachide et sélection au Moyen Congo. [**Mechanized cultivation of groundnuts and selection in the Middle Congo.**] *Oléagineux* 1954, **9,** No. 11, 759-65, illus. [Inst. Rech. Huiles et Oléagineux, Loudima, Niari]

The problem of selecting groundnut varieties suitable for mechanized harvesting in the Niari Valley is examined. For the first crop, which is harvested in January-February on moist, loose soil, the variety Improved Spanish 270 A is preferred to 270 M. For the second crop, which is harvested in May-June on dry soil, both 270 A and 270 M are satisfactory.—E.B.O.

484 BULLETIN D'INFORMATION DE L'INÉAC. La désinfection des semences d'arachide. [**The disinfection of groundnut seeds.**] *Bull. Inform. INÉAC* 1954, **3,** No. 5, 287-94.

In field trials carried out in the Congo Basin to test various fungicidal dusts for treating groundnut seeds, the following yields (percentages) were obtained : (a) from hand-shelled, untreated seed, 100 ; (b) from machine-shelled, untreated seed, 80 ; (c) from hand-shelled, treated seed, 110 ; (d) from machine-shelled, treated seed, 110. The best fungicides tested were those based on Thiram (e.g. Arasan) or on Captan (e.g., Orthocide) and some organo-mercury preparations (e.g., Ceresan, Granosan and Agrosan GN). The seed is generally treated immediately before sowing, but the efficacy of the treatment is maintained if the seed is stored for 1-2 months after treatment. The rate of 200 g. of fungicidal dust per 100 kg. of seed is sufficient and should not be exceeded.—E.B.O.

485 SMITH, B. W. ***Arachis hypogaea.* Reproductive efficiency.** *Amer. J. Bot.* 1954, **41,** No. 8, 607-16, bibl. 23, illus. [N. Carolina State Coll., Raleigh]

This paper is part of a general series on the reproductive behaviour of the groundnut or peanut (*Arachis hypogaea*), undertaken to study the losses in "fruiting potential" which occur at various stages in fruit and seed development. The paper first describes the remarkable cyclic periodicity of flower production observed in Spanish and Virginia varieties of this crop. Though flowering is prolific, relatively few flowers produce mature pods. The following aspects of the problem were studied : the seasonal distribution of flower production and its relation to fruiting ; the effect of flower removal on fruit development and of fruit removal on flower production ; and the role of calcium, a deficiency of which inhibited fruiting. Since the pods which cease to develop remain on the plant the stages reached could be determined by studying the relative number of fruits at harvest in the various aerial and subterranean stages. Approximately 40% of the flowers failed to begin fruit development, another 40% produced immature pods and 13·5% produced mature pods. Calcium deficiency inhibited seed development but did not increase the disparity between fruiting potential and mature pods produced.—D.B.

486 FOWDEN, C. **The nitrogen metabolism of groundnut plants : the role of γ-methyleneglutamine and γ-methyleneglutamic acid.** *Ann. Bot., Lond.* 1954, **18,** No. 72, 417-40, bibl. 29, illus.

The changes occurring in the nitrogenous compounds during the growth of groundnut seedlings in the dark and light were compared, particular attention being centred on the levels of γ-methyleneglutamine, the principal amide of these plants, and γ-methyleneglutamic acid. The distribution of amino acids and amides in the main organs of normal young and mature plants was also examined. Suggestions are made concerning the possible pathways of synthesis and the functions of γ-methyleneglutamic acid and γ-methyleneglutamine in groundnut plants.—Author's summary.

487 WESSELS, D. G. and PRETORIUS, T. P. **Fertilizer experiments at the Vaalhartz Agricultural Research Station (1946-1950).** *Sci. Bull. 338. Dep. Agric. S. Afr.* 1953, pp. 76, bibl. in text, illus.

Groundnuts, pp. 5-16, 28-33, 40-4. The yield of groundnuts was significantly increased by the addition of nitrogenous fertilizers. Applications of superphosphate at the rate of 800 lb. and 400 lb. per morgen [1 morgen = 2·116 ac.] gave similar yields. For this crop the P : N ratio in the fertilizers appeared to be important. Kraal manure and rock phosphate increased yields slightly, and groundnuts yielded well when grown after barley. The P, calcium and protein contents were highest in the kernels after high application of phosphate, but the presence of N reduced their calcium content. Phosphate increased the amount of nutrients (P, Ca, and Mg) in the shell, whereas potash acted as an inhibitor.—M.P.

488 MALLIK, A. K. and others. **Complete enumeration experiment in groundnut crop for developing the optimum shape and size of samples for crop weather observations.** *Proc. Indian Acad. Sci. Sect. B* **40,** No. 1, 8-16, bibl. 11, illus.

PEAS

489 GROSS, F. C. **The field pea industry in South Australia.** *J. Dep. Agric. S. Aust.* 1954, **58,** No. 3, 112-25, bibl. 4, illus.

This article deals generally with the cultivation, uses and feeding value of field peas in South Australia. Peas are the only leguminous crop which can be grown successfully in certain areas of the cereal belt. The 3 varieties grown in South Australia are: Early Dun, White Brunswick and Collegian. Trials at the Waite Agricultural Research Institute have shown that early sowing gives the highest yields. The rate of seeding recommended for general sowing is 90 lb. per ac., increasing to 120 lb. per ac. for late sowing, or under adverse soil conditions. A dressing of 1-1·5 cwt. of superphosphate is the only fertilizer needed in most cases. The need for care in harvesting is stressed. Histograms summarize recent production and price trends.—M.P.

490 TILT, J. and TAYLOR, B. L. **Field peas.** *Tasm. J. Agric.* 1954, **25,** No. 3, 230-9, bibl. 2, illus.

A general account of the growing of field peas in Tasmania is given, together with a description of the two main varieties, Maple and Prussian Blue, and notes on several others. The best place in the crop rotation for peas, the preparation of the soil, the quantities of fertilizers required and the time of sowing are discussed. Rate-of-seeding trials have, to date, given no conclusive results.—From authors' summary.

491 LABRUYÈRE, R. E. and RIEPMA WZN, P. De teelt van erwten in verband met bodem, klimaat en plantenziekten. [**The pea crop in relation to soil, climate and disease.**] *Landb-Voorl.* 1954, **11,** No. 10, 481-97, bibl. 5, illus. [Agric. Res. Inst., Wageningen]

Statistics on crop yields, reports on the incidence of diseases and some experimental data are used in this review of the effect of soil type and condition, climate and disease on the pea crop in the Netherlands. Experimental data are quoted to show the beneficial effect of farmyard manure (used in conjunction with artificial fertilizers) on pea yields. In an experiment on heavy clay in Groningen Province in 1943, 1945 and 1946, the average yield of peas at ground-water-levels of 40, 60, 90, 120 and 150 cm. below the surface was 21·1, 26·5, 28·7, 30·3 and 31·3 kg. per are, respectively. The high pea-yields of the south-western clay region compared with other regions are partly attributed to the milder weather prevailing there in spring. The distribution of the commoner diseases of peas in the Netherlands is described.—W.J.B.

492 PLAUT, M. and HALFON, Aliza. **The viability test of pea, bean and cucumber seeds by resazurin staining.** *Proc. internat. Seed Test. Ass.* 1954, **19,** No. 1, 14-23, bibl. 16, illus. [Govt Agric. Res. Sta., Israel]

In preliminary trials, field peas were immersed for 24 hr. in a 0·005% solution of resazurin at 28-30°C. On the basis of the results, the following 4 categories of red-staining response, according to viability, were defined: (a) radicle completely stained, (b) radicle almost completely stained, either with 50 or 75% of the radicle area stained, with clear demarcation between stained and unstained portion, (c) 50% of radicle stained, with no clear demarcation between stained and unstained portions, (d) radicles stained at tips only, or unstained. Categories (a) and (b) indicated non-viable seed and categories (c) and (d) viable seed. In trials with different concentrations of resazurin, 0·003% solutions, with an immersion time of 17 hr. were optimal. For immersion periods of 12, 17 or 24 hr., temperatures of 25-32°C. gave the best results. Comparisons of viability determinations using resazurin and germination tests showed a fairly good correspondence between the two methods when used on pea, bean and cucumber seed.—P.J.B.

493 BISSET, S. K. **The non-protein nitrogen of extracts of *Pisum sativum*.** *Biochem. J.* 1954, **58,** No. 2, 225-7, bibl. 10.

The extraction of soluble N-containing compounds from green seed-peas by cold and hot saline solutions and by hot and cold water and the removal of protein from these extracts is described. The results of non-protein nitrogen determinations are discussed.—M.P.

494 FOURMONT, R. Introduction à un système de nomenclature des variétés de pois cultivées en France. [**Introduction to a system of nomenclature of pea varieties cultivated in France.**] *C.R. Acad. Agric. Fr.* 1954, **40,** No. 13, 499-502, bibl. 8. [I.N.R.A. Sta. Cent. Genet. Amélior. Pl., Versailles]

A new classification of the *Pisum sativum* varieties grown in France is shortly to be published as a monograph. This article outlines briefly some of the characters used in the new classification.—M.P.

495 LEHMANN, C. O. Das morphologische System der Saaterbsen. [**The morphological classification of the pea.**] *Züchter* 1954, **24,** No. 11/12, 316-37, bibl. 18, illus. [Dtsch. Akad. Wissenschaft Berlin, Gatersleben]

The paper is a treatise on the classification of *Pisum* and chiefly the varieties of *P. sativum*. Their origin and morphological features are described. A key to their determination, their synonyms and geographic distribution is given.—D.B.

496 SCHEIBE, A. Der *fasciata*-Typus bei *Pisum*,

seine pflanzenbauliche und züchterische Bedeutung. [**The fasciated type in *Pisum*, its importance as regards cultivation and breeding.**] *Pfl. Zücht.* 1954, **33,** No. 1, bibl. 23, illus. [Max-Planck Inst. Züchtungsforschung, Neuhof bei Giessen, Germany]

The morphological features of the *fasciata* type of *Pisum sativum* with its banded 4-cornered stem and its flowers grouped at the top of the shoot instead of being distributed regularly along the stem, are briefly described. The type appears as a mutation and is inherited as a recessive character. This *fasciata* type has several desirable agricultural properties. Because of the crown-like position of the flower and hence the pod-bearing region, the pods are held high above the ground, which results in a more rapid drying of pod and seed than in the normal type. The flowering period is short, therefore all the pods are at a similar stage of ripening. Because of the telescoping of the flowering region, attack by the pea moth (*Grapholitha nigricana*) is made more difficult. Another desirable property is the regeneration of the shoot after injury, e.g., after being nibbled by animals.—D.B.

497 TORREY, J. G. **The role of vitamins and micronutrient elements in the nutrition of the apical meristem of pea roots.** *Pl. Physiol.* 1954, **29,** No. 3, 279-87, bibl. 30, illus. [Univ. Calif., Berkeley]

Since the view is held that root meristem requires mature, differentiated tissues, particularly vascular tissue, for development and growth, attempts were made to grow root tips, 0·5 mm. long, consisting of root cap and undifferentiated tissue, completely lacking in mature vascular tissue, in a nutrient medium. The modifications made in the usual nutrient medium were : replacement of ferric tartrate with ferric chloride, a tenfold increase in the concentration of the vitamins thiamin and nicotinic acid, the addition, in trace amounts, of salts of the micronutrient elements Zn, Mn, Mo, B, and Cu, and an increase in the concentration of sucrose from 4 to 6%. Since this medium supported the growth and differentiation of excised root meristems, it is concluded that it provided the nutrients otherwise supplied by the mature tissues. No root growth occurred in the absence of either or both vitamins. Addition of all five micronutrient elements to the vitamin-containing medium resulted in a 100% increase in root length.—D.B.

BEANS

498 MOËS, A. L'amélioration de la féverole. [**Improvement of the field bean.**] *Rev. Agric., Brux.* 1954, **7,** No. 11, 1306-8. [Sta. Rech., Gembloux, Belgium]

Minor, a new, small-seeded variety of *Vicia faba*, has been released for cultivation. It gives yields as high as the large-seeded Dutch variety Niki but is 2-6 days earlier. Cultivation trials have demonstrated that, in Belgium, early March is the most favourable date for sowing Minor. Its place in a rotation and the effect of different quantities of fertilizer on yield (not statistically significant) are very briefly discussed.—D.B.

499 REBSTOCK, T. L. and others. **The influence of 2,4-dichlorophenoxyacetic acid on the phosphorus metabolism of cranberry bean plants (*Phaseolus vulgaris*).** *Pl. Physiol.* 1954, **29,** No. 5, 490-1, bibl. 10. [Michigan State Coll., East Lansing]

The P content of leaf, stem and roots of 2,4-D-treated and non-treated bean plants was determined and expressed as mg. P per 100 plants. In the leaf, the total P content was lower in treated than in non-treated plants ; in the stem it was higher, while in the root there was no appreciable change. The striking change in the nucleic acid content (one of the four P fractions) of the stem may account for the unusual growth and development of the plant as a result of treatment with 2,4-D.—D.B.

500 FANG, S. C. and BUTTS, J. S. **Studies in plant metabolism 4. Comparative effects of 2,4-dichlorophenoxyacetic acid and other plant growth regulators on phosphorus metabolism in bean plants.** *Pl. Physiol.* 1954, **29,** No. 4, 365-8, bibl. 13, illus. [Oregon State Coll., Corvallis]

[See also *Fld Crop Abstr.* 7 : 812.]

501 MINSHALL, W. H. **Translocation path and place of action of 3-(4-chlorophenyl)-1 : 1-dimethylurea in bean and tomato.** *Canad. J. Bot.* 1954, **32,** No. 6, 795-8, bibl. 3. [Sci. Serv. Lab., Canada Dep. Agric., London, Ontario]

The results are given of studies on the movement and site of action of different concentrations of CMU applied either to the roots or leaves of potted tomato and bean plants placed in CMU solutions. With the excised tops of tomato plants, water-soaked spots in the leaves developed within 3 days where 2 ppm. concentrations of CMU were used ; intact tomato plants required 5 days for spots to appear. With beans, 4 to 5 days were required before spots appeared on the leaves ; the time taken being one day shorter for excised than for intact plants. From these results, it was apparent that CMU had ready access to the vascular system of the plants and was translocated upwards to the leaves until lethal concentrations were reached. The roots of treated plants lived for some days after the leaves were killed.—P.J.B.

502 Riepma Wzn, P. Onderzoek naar de invloed van M.C.P.A. op bloei en vruchtzetting bij veldbonen. [**Investigation into the effect of MCPA on flowering and fruit setting in field beans** [*Vicia faba*].] *Rep. Cent. Inst. agric. Res., Wageningen 1953* 1954, 110-13, bibl. 8, English summary pp. 112-13.

An attempt to prevent losses of flowers and small pods through using MCPA on field beans is described. MCPA was applied in 1952 at 0·5, 1 and 2 l. per ha. (1 kg. active material in 11 l. MCPA) when flowering was at its maximum and after setting of the pods. All rates of application reduced bean yields, the effect being more marked with the higher rates. The greatest damage was caused to the bean crop when sprays were applied when flowering was at its maximum. The two higher rates (but not the 0·5 l. per ha. rate) caused a reduction in the number of pods per plants when MCPA was applied after setting of the pods. In 1953, a similar experiment was carried out with an additional rate of application (0·25 l. per ha.) and an additional time of application (beginning of flowering). All applications reduced yields of beans, compared with no application, except the application at the 0·25 l. per ha. rate at the beginning of flowering.—w.j.b.

503 Shoji, K. and Addicott, F. T. **Auxin physiology in bean leaf stalks.** *Pl. Physiol.* 1954, **29,** No. 4, 377-82, bibl. 19, illus. [Univ. California, Los Angeles]

See also Abs. 676.]

504 England and Wales. Ministry of Agriculture and Fisheries. **Black bean aphid** [*Aphis fabae*]. *Adv. Leafl. 54. England and Wales. Minist. Agric. Fish.* 1954, pp. 5.

LENTILS

505 Godyljan, I. S. [**Cultural measures for *Ervum* sp. in the dry steppe.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 10, 51-3.

Cultural measures (tested by the Ukrainian Scientific Research Institute for Grain Crops) are reported, together with information on yields obtained when the sowing dates and methods recommended are applied on certain collective farms in the Dnepropetrovsk Province.—m.h.

OTHER

506 Gončar, A. I. [**Extending the sowings of lupins for green manure.**] [Russian] *Zemledelie* (*Agriculture*) 1954, **2,** No. 6, 57-60, illus.

In order to study the possibility of extending the sowings of annual lupins for green manure, tests were carried out during 1947-53 on the use of this plant for green manure when sown with a grain crop or on cereal stubble. Under the conditions of the Ukraine forest belt, yields of green matter were much greater (22·2 tons/hectare) from sowing in a cereal crop than from sowing on stubble (5·4 tons/hectare). Information is supplied on management and yields of lupins when sown in a cereal crop and when used as green manure. The lupin can be sown in the winter cereal crop when the latter is at the beginning of flowering to completion of milk ripeness stage. Usually if the winter grain is harvested about 20-25 July, the height of the lupins at this time is not more than 25 cm. and they are therefore mostly undamaged by the combine harvester.—m.h.

507 Singh, R. S. **Effect of mixed cropping on the incidence of root-rot, wilt and associated diseases of *Cyamopsis psoralioides*.** *Agra Univ. J. Res.* 1954, **3,** Pt. 2, 359-73, bibl. 6, illus. [Govt Agric. Coll., Kanpur, India]

A study was made in 1949-51 of the effects of mixed cropping and inter-cropping on the incidence of root-rot (*Rhizoctonia solani*), seedling-rot and leaf-blight (also caused by *Rh. solani*) and wilt (*Fusarium coeruleum*) in *Cyamopsis psoralioides*. *C. psoralioides* was sown either alone or mixed, or inter-cropped with 1, 2 or 3 of the following crops : *Vigna catjang, Phaseolus aconitifolius, Sorghum vulgare, Glycine soja, Ph. mungo, Ph. radiatus*. The following sowing methods were used : (a) pure and mixed seed broadcast, (b) pure and mixed seed in rows 2 ft. apart, (c) rows of *Cyamopsis* (with 2 ft. between plants) as pure stands or inter-cropped with rows of other crops. Where sowing-method (a) was used, the lowest rate of mortality (8-14%) in *C. psoralioides* from the diseases mentioned occurred where *C. psoralioides* was sown mixed with *S. vulgare* and *Ph. aconitifolius* : the rate of mortality in pure stands of *C. psoralioides* was 49-61%. Sowing *C. psoralioides* with *Vigna catjang, Sorghum vulgare* and *Ph. aconitifolius* also gave a significant reduction in the mortality rate (to less than 20%) compared with pure stands. The results obtained when sowing-method (b) was used were almost the same as those obtained using method (a). Where sowing-method (c) was used, sowing other plants in conjunction with *C. psoralioides* generally caused a greater reduction in the mortality of *C. psoralioides* plants than when sowing-methods (a) and (b) were used. All the plant species mentioned, or combinations of them, when intercropped with *C. psoralioides*, gave reductions of mortality from *Rh. solani* and *F. coeruleum* ; the greatest consistent reductions were given when the *C. psoralioides* was inter-cropped with *S. vulgare, Vigna catjang*, and *Ph. aconitifolius* (giving a mortality of

8-14% compared with about 40% in the pure stands) and with *S. vulgare* and *Ph. aconitifolius* (giving a mortality of 9-15%). The reasons for the reductions in the incidence of the diseases caused by mixed cropping and inter-cropping are discussed. —W.J.B.

508† SINGH, R. S. **Root-rot and wilt of *Cyamopsis psoralioides* in relation to date of sowing.** *Agra Univ. J. Res.* 1954, **3,** Pt. 2, 375-83, bibl. 2, illus. [Govt Agric. Coll., Kanpur, India]

The effect of different sowing dates on the incidence of plant mortality caused by root rot (*Rhizoctonia solani*) and wilt (*Fusarium coeruleum*) in crops of *Cyamopsis psoralioides* was determined. The crops were sown, on soil artificially contaminated with the fungi, at intervals of 13-15 days between 1 May and 28 August in 1949, 1950 and 1951. Plant mortality was lowest in crops sown during the first and second week of May (less than 14% in all years) and highest in crops sown in the last week in July (40-44%). In the area where the experiments took place, early sowing to reduce the incidence of the diseases can only take place in irrigated tracts. —W.J.B.

GENERAL

509 SMITH, D. and others. **Establishment of legumes as influenced by the rate of sowing the oat companion crop.** *Agron. J.* 1954, **46,** No. 10, 449-51, bibl. 13. [Wisconsin Agric. Exp. Sta., Madison]

In trials during 1947-50 at 4 locations in Wisconsin, Clinton, Bonde, Forvic and Vicland oats, sown at rates of 0·5, 1, 1·5, 2, 2·5 and 3 bu. per ac. were used as companion crops to lucerne + medium red clover mixtures sown at a rate of 6 lb. of each component per ac. The forage mixture was sown immediately after the oats were sown. The oats were harvested for grain, all straw was removed from the plots and counts made of the legume stands during autumn. At all locations, except one on Miami silt-loam, lucerne and red clover stands were reduced significantly by increases in the sowing rates of the oats. On relatively heavy soils, differences between legume stands undersown under oats sown at rates of 0·5 and 3 bu. per ac., though significant, were small. This was thought to be partly the result of favourable spring-moisture conditions and partly the result of the relatively high populations of weeds which established themselves on plots sown with low rates of oats. On sandy soils, moisture competition between the oats and legumes appeared to be the main factor in causing low yields where high sowing rates of oats were used. There were no significant differences in legume establishment which could be attributed to the variety of oats used.—P.J.B.

510† EGLE, K. and MUNDING, Herta. Ausbildung und Funktion von Hämoglobin in den Wurzelknöllchen von Leguminosen. [**Formation and function of haemoglobin in the root tubercles of legumes.**] *Biol. Zbl.* 1954, **73,** No. 11/12, 577-602, bibl. 44, illus. [Bot. Inst., Univ. Frankfurt-am-Main]

The presence of haemoglobin in the root tubercles of legumes is believed to be connected with the fixation of atmospheric nitrogen. Investigations over the past 14 years have led to conflicting results and the literature on this subject from 1937-53 is here reviewed. The authors also present the results of their own work on the quantitative determination and distribution of this "Leghaemoglobin" and the factors which influence its formation. Two types of tubercle were examined, viz. the pea type and the lupin type, during the vegetative and flowering periods.—D.B.

ROOTS

SUGAR-BEET

511 WILLIAMS, W. A. **Green manures increase sugar beet yields.** *Spreckel's Sug. Beet Bull.* 1954, **18,** No. 2, 10-11.

In studies in California, plots were: (a) fallowed, (b) sown to barley, (c) sown to barley + vetch (*Vicia* sp.) and (d) sown to vetch in September, the vetch being ploughed under to a depth of 10 in. in January before sowing sugar-beet on 5 February. The amounts of dry matter ploughed under in the case of (b), (c) and (d) were 4950, 3690 and 2620 lb. per ac., and of N, 62, 87 and 115 lb. per ac., respectively. At harvest during the following September, plots given treatments (a), (b), (c) and (d) gave root yields of 13·5, 15·2, 18·9 and 22 tons per ac., with sucrose contents of 16·9, 16·7, 16·6 and 16·7%, respectively. Where 120 lb. N was also applied, respective root yields were 19·3, 23·2, 27·1 and 26·6 tons per ac., with sucrose contents of 16·2, 16·3, 15·6 and 15·7%.—P.J.B.

512 LÜDECKE, H. Der Begriff des "bereinigten Zuckerertrages" als Bewertungsgrösse für die Leistung der Zuckerrübe. [**The concept of "corrected sugar yields" as a means of evaluating the productivity of the sugar-beet.**] *Landw. Forsch.* 1954, **7,** No. 1, 24-30, bibl. 13, illus.

Of the systems in use for evaluating varieties and strains of sugar-beet, none takes into account the loss of sugar caused by the presence of molasses-forming substances in the beet which prevent the crystallization of sugar. The concept of corrected sugar yield takes these substances into account. The "corrected sugar content" of the beet is deemed to be the sugar content as determined by

polarization minus the calculated quantity of non-crystallizable sugar. "Corrected sugar yield" is the corrected sugar content × beet yield.—D.B.

513 MADSEN, A. Forsøg i Frøafgrøder 1953. [**Trials on seed crops (in Denmark), 1953.**] *Dansk Frøavl* 1954, **37,** No. 7, 85-91.

Data are given of trials in Denmark in which beet [type not specified] crops, destined for seed production during the following year, were sown : (a) adjacent to, (b) 300-500 m. from, and (c) 1000-1500 m. from other beet seed-crops. Average seed-yield during 1950-3 (18 trials) for the years following treatments (a), (b) and (c) were 18·1, 22·7 and 23·1 hkg. per ha., respectively. Seed yields of roots grown in N. and W. Jutland (relatively virus-free areas) averaged 25·2 hkg. per ha. Respective percentages of plants with virus yellows following treatments (a), (b) and (c) and in plants grown from roots from Jutland averaged 47, 25, 24 and 19. In further trials, beet roots for seed were planted in spring and treated as follows : (a) untreated, (b) sprayed on 1 and 15 June, (c) sprayed on 1 and 15 June and 1 July, and (d) sprayed on 1 and 15 June, 1 and 15 July and 1 August. The spray used was 1000 l. of 0·05% Systox per ha. In 1951-3 in 8 trials, the mean percentages of plants infected with virus yellows following treatments (a), (b), (c) and (d) were 39, 33, 26 and 25, respectively. In further trials, beet seed-plants were treated as follows : (a) no treatment, (d) sprayed twice with Systox, (c) sprayed 3 times, and (d) sprayed 4 times. 1000 l. of 0·05% Systox were used per ac. In 1952-3, in 7 trials, mean seed-yields following treatments (a), (b), (c) and (d) were 23·2, 23·9, 23·8 and 24·2 hkg. per ha., respectively. In these trials, the incidence of aphids was very low. In neither trial series with Systox was complete control of virus yellows, or aphids, secured.—P.J.B.

514 CIAMPOLINI, M. Il *Blaniulus guttulatus* (Bosc) dannoso alla barbabietola nel ferrarese. [***Blaniulus guttulatus* injurious to sugar-beet in Ferrara Province.**] *Industr. saccar. ital.* 1954, **47,** No. 9-10, 337-9, illus.

Measures for controlling the myriapod *B. guttulatus* are suggested.—E.B.O.

515 ENIKEEV, S. G. [**Anatomical structure of the root head of sugar-beet with reference to the formation of a cavity in it.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **98,** No. 5, 853-5, bibl. 1, illus. [Kirgiz Agric. Inst.]

See also *Fld Crop Abstr.* 7 : 519.]

516† REINAU, E. H. Schwellenwert der CO_2 in Luft der Grüngrenze eines Zuckerrübenschlages bei Gewitterregen. [**The threshold value of CO_2 in the air which borders on the "green limit" in a sugar-beet stand during thunder rain.**] *Ber. dtsch. bot. Gesellsch.* 1954, **67,** No. 2, 44-7, bibl. 5, diagram 1.

The author distinguishes between the CO_2 content of air where the plant borders on the free atmosphere and its CO_2 content in the layer of air adjacent to the soil, especially in dense stands of crop plants. He develops his "residual hypothesis" and his ideas on "soil-born" CO_2 and the value of this CO_2 to crop yield. The attempts, since 1920, at exactly determining the CO_2 content of air in contact with different parts of plants are briefly reviewed. A 24-hour record is reproduced of CO_2 determinations made by the URAS apparatus at the uppermost limit of a sugar-beet stand and the records are correlated graphically with meteorological data. A single sample, taken at soil level in a meadow, demonstrates the great difference in CO_2 content in adjacent layers of air.—D.B.

517 NETHERLANDS. Commissie ter Bevordering der Suikerbietenteelt in de Noordelijken Provinciën. Rapport over 1953. [**Report, for the year 1953, of the Society for the Promotion of the Cultivation of Sugar-Beet in the Northern Provinces.**] *Meded. Inst. rat. Suikerprod.* 1954, **24,** No. 1, 1-99.

Among investigations reported are:

1. Plant population, pp. 8-12. Plant populations of 45,000, 64,000 and 75,000 per ha. were used. The variety Klein Wanzleben E gave roughly equal yields of tops, roots and sugar-content at all 3 plant populations. In the case of Nemos, yields of tops, roots and sugar were progressively lower with decreasing plant populations : yields of sugar were 95·3 and 87·3 kg. per are, respectively, [1 are = 0·01 ha.] at plant populations of 75,000 and 45,000 per ha. [See *Fld Crop Abstr.* 7 : 1080 for results in 1952.]

2. The effect of sowin gdate on yields of sugar and on the percentage of bolters, pp. 12-18. Bolters were counted in September. The percentage of bolters in plants sown on 8 March and 28 March, respectively, was 44% and 32%. There were no bolters among plants sown on 17 April. The production of sugar by plants sown on the 3 sowing dates mentioned above was 50·3, 66·3, and 78·7 kg. per are, respectively.

3. The effect of hail damage on yields of leaf, roots and sugar, pp. 18-23. Hail damage was imitated by damaging the leaves with forks. Seed was sown on 14 April and damage was done on 18 June, 15 July and 16 August. The weight of roots, leaves and sugar yielded per ha. was reduced by the damage, and the reduction was increasingly great with increasing lateness of occurrence of the damage. Plants damaged on 18 June and 16 August yielded, respectively, 10 and 17% less sugar per are than undamaged plants.

4. The effect of a delay between lifting and harvesting on the yields of sugar, pp. 28-31. As in the

previous year [see *Fld Crop Abstr.* 7 : 889], beet lifted, but left untopped on the ground for a period of 3 weeks, had a slightly higher sugar content and yielded slightly more sugar per are than beet left in the ground during the same period (30 September to 22 October).

5. The effect of sowing date on the incidence of virus yellows, pp. 39-47. Results of the 1953 survey of virus yellows in the Northern Provinces are tabulated. An analysis was made of the apparent effect of sowing date on the incidence of virus yellows, on the farms surveyed. The incidence, in crops sown in March, the first and second halves of April and in May, respectively, was 2·7, 5·9, 7·7 and 7·3%.—W.J.B.

FODDER-BEET

518 SCOTTISH AGRICULTURE. **Notes from Auchincruive—8.** *Scot. Agric.* 1954, **34,** No. 3, 171-2.

A comparison was made of storage losses in fodder-beet topped by cutting through the leaf bases and by cutting through the crown. Over a 5-month period, respective storage losses in terms of fresh weight were 8·2 and 8·5%. The dry-matter content of the roots at the end of 5 months was 17·8 and 18% for the two methods of topping. It was concluded that the convenience of topping the roots through the crown was not offset by increased root bleeding.—P.J.B.

519 JENKINS, W. LL. **Mangolds and fodder beet.** *J. agric. Soc. Univ. Coll. Wales* 1954, **35,** 25-8, bibl. 4.

A comparative study was made of the yield and composition of fodder-beet and mangel varieties at the College Farms at Aberystwyth from 1947-9. The yield of roots and crude protein per ac. was greater from mangels, but the yields of dry matter and sugar per ac. were greater from the fodder-beet. Results confirmed that the percentage dry-matter content of both crops is lower in a wetter climate. Farmyard manure, as well as a complete fertilizer, was needed for high crop yields, but no benefit was obtained from the use of N as a top-dressing at singling time. After 4 months of storage under the conditions generally used, both crops showed about a 12% loss in the weight of dry matter present.—M.P.

520† NORTHERN IRELAND. Agricultural Research Institute. **Twenty-seventh Annual Report 1953-4.** *Rep. agric. Res. Inst. N. Ire.* 1954, pp. 38. [Hillsborough]

Fodder-beet, pp. 23-4. Preliminary trials were carried out with the varieties Hunsballe and Red Øtofte to test maleic hydrazide, used in spray form, as a means of increasing the dry-matter content of the roots. Spraying had a negligible effect on Hunsballe, while in Red Øtofte the slight increase in the percentage of dry matter and sugar in the roots of sprayed plants was more than offset by a marked lowering in the yields of roots per ac.—M.P.

521 GREAT BRITAIN. National Institute of Agricultural Botany. **Strains of fodder beet and mangel.** *Fmrs' Leafl. 6. NIAB* 1954, pp. 5.

522 LEHR, J. J. and BUSSINK, A. T. Wijzigingen in de inzichten omtrent natrium. [**Modifications in opinion on the role of sodium.**] *LandbVoorl.* 1954, **11,** No. 11, 527-32, bibl. 4, illus. [Lab. Bemestingsonderz., Landbouwk. Dienst Chilisalpeter]

Some recent work on the part played by Na in the growth of field crops is briefly reviewed. An account is given of an experiment, carried out by the authors, to determine whether signs of sodium deficiency could be induced in fodder-beet plants by applying nitro-chalk or calcium nitrate instead of Chilean (sodium) nitrate as a source of N. The effect on fodder-beet plants of Chilean nitrate applied at a rate of 850 kg. per ha. was compared with that of nitro-chalk and ammonium nitrate [rates of application not given] on plots to which potassium chloride was applied at rates of 0, 150, 300 and 450 kg. K_2O per ha. The percentage of plants showing slight signs of mineral deficiency (dying-off of the leaf edges) was less than 5% on plots receiving Chilean nitrate. On plots receiving nitro-chalk and ammonium nitrate 30-50% of the plants showed symptoms, in many cases severe, of mineral deficiency. The quantity of K_2O applied to the various plots did not affect the incidence of the symptoms. The authors conclude that the symptoms were those of Na-deficiency.—W.J.B.

TURNIPS

523 CRUICKSHANK, I. A. M. and PALMER, T. P. **Resistance of swede varieties to dry-rot (*Phoma lingam* (Tode) Desm.).** *N.Z. J. Sci. Technol. Ser. A* 1954, **36,** No. 2, 122-8, bibl. 15. [Dep. Sci. Industr. Res., Christchurch, N.Z.]

Dry rot is a serious and widespread disease of swedes (*Brassica napobrassica* Mill.) and turnips (*B. rapa* L.) in South Otago and Southland. The incidence of severe dry rot in crops of the swede variety New Zealand Wilhelmsburger is low. An inoculation etchnique which gives uniform infection in susceptible varieties is described. Forty-five lines of swedes were tested for reaction to dry-rot in glasshouse and field trials. Many of the varieties appeared to be mixtures of susceptible and resistant plants. The varieties Weibull's

Balder, Weibull's Wilhelmsburger, and a line of Wilhelmsburger Øtofte of unknown origin, had a high proportion of resistant plants.—Authors' summary.

524 REITH, J. W. S. **Recent advances in fertilizer placement. 1. Fertilizer placement for swedes and turnips in Scotland.** *J. Sci. Fd Agric.* 1954, **5,** No. 9, 421-8, bibl. 5. [Macaulay Inst. Soil Res., Aberdeen]

During 1947-52 over 40 field experiments were carried out to compare broadcast and band applications of sulphate of ammonia, superphosphate, muriate of potash, 40% potash salts and 2 granular NPK fertilizers. Placement positions at distances up to 3 in. to the side of the row and up to 3·5 in. below the soil surface were examined by using a special drill machine developed by the National Institute of Agricultural Engineering. Placing superphosphate directly below the seed at a depth of about 3-3·5 in. from the soil surface has consistently given higher yields than placing it in other positions or broadcasting. The results show that there is no advantage in placing sulphate of ammonia, and that placing it directly below the seed may be harmful to early growth. There is no benefit or disadvantage from placing muriate of potash (60% of K_2O), but with 40% potash salts broadcasting is likely to be better than placing below the seed. With NPK fertilizer mixtures there does not appear to be any benefit from placing, and this seems to be due to the positive effect from superphosphate being counterbalanced by the negative effect from a mixture of nitrogen and potash.—Author's summary.

POTATOES

525 ANAGNOSTOPOULOS, P. T. **The influence of the meteorological conditions on the culture of potato.** [Summary] *Agric. Tribune* Sept., 1954. [Athens, Coll. Agric.]

The author enumerates the various factors of importance in the production of high potato yields. A detailed study was made of the meteorological conditions during plant growth. The optimum air and soil temperatures at planting, sprouting and flowering, and the day length for first and second crop potatoes were determined. The main conclusions he draws are that the optimum soil and air temperature at flowering is 15-18°C., with a relative humidity of 65-66%, for potatoes grown in Athens. There planting should be carried out in February-March for the first crop, and mid-August for the second crop. Under these optimum conditions he obtained potato yields of 20,000-50,000 kg. per ha. from the first crop, and 20,000 kg. per ha. from the second crop, as compared with the 1951 average for Greece of 11,000 kg. per ha.—M.P.

526 SAPTHARISHI, K. and AZARIAH, M. D. **Studies on the influence of the time of planting and mulching on the yield of potato.** *Madras agric. J.* 1954, **41,** No. 7, 221-7, bibl. 6. [Agric. Res. Sta., Najanad, India]

Trials in 1949-51 are described in which the optimum planting time for rain-fed main-crop (first-crop) and second-crop potatoes was determined. In all three years the optimum planting dates were mid-April for main-crop potatoes and the beginning of August for the second crop. Preliminary trials are reported in which the effect on potato yields of applying mulches of 1250, 5000, 8000 and 10,000 lb. per ac. of vegetable debris to the newly planted crops was determined in 1951-2. In both years the crops receiving mulches of 8 and 10 thousand lb. per ac. significantly outyielded plots receiving other treatments including the control plot (no mulch).—W.J.B.

527 MOURSI, M. A. **The effect of weed competition and pruning of roots on the physiological ontogeny of the potato crop.** *Amer. Potato J.* 1954, **31,** No. 6, 178-82, bibl. 7. [Veg. Crop Dep., Alexandria Univ., Egypt]

An investigation was carried out to study the effect of root pruning and weed competition on the growth of the potato. Three treatments, with 6 replicates of each, were given to potato plants of the Red skin variety grown in plots at the Edinburgh Agricultural Experiment Farm: (a) pruning the roots at 4 in. from the plant to a depth of 4 in., the weeds being hand-pulled; (b) hand-weeding; (c) no weeding. Results indicated that pruning checked the growth of the potato plants; the relative growth rate (estimated on the basis of the dry weight of the plant) and the relative leaf-growth rate (estimated on the basis of the dry weight of the leaves per plant) first decreased, then the plants rebuilt their roots and resumed their activities. Weeds competed with the crop causing a slight reduction in the relative growth rate and relative leaf-growth rate. The values of the net assimilation rate (rate of increase in the dry weight of a plant per unit of active growing material) were placed in the following decreasing order according to treatment: hand-weeding, pruning and no weeding but the difference between any two of these values did not reach the 5% level of significance.—E.B.O.

528 BRADLEY, G. A. and PRATT, A. J. **The response of potatoes to irrigation at different levels of available moisture.** *Amer. Potato J.* 1954, **31,** No. 10, 305-10, bibl. 22. [Cornell Univ., Ithaca, N.Y.]

Trials carried out during 1952-3 indicated that potato yields were higher when irrigation was given before the available moisture in the soil had dropped much below 50%, as indicated by the

moisture meter. This seemed to be especially true on light soils, whether the rooting zone (that portion of the upper 18 in. of soil from which the plants absorbed water) was filled to field capacity as in 1953, or when only 1 in. of water was applied by irrigation as in 1952. The principal effect of irrigation on potatoes in 1952 was to increase the number of potatoes over 2 in. ; the average size of the tubers did not vary much. The principal effect of irrigation in 1953 was to increase the average size of the tubers above 2 in.—E.B.O.

529 KOPETZ, L. M. Die Beregnung im Dienste des Pflanzenbaues. [**Spray irrigation in the service of plant cultivation.**] *Bodenkultur* 1953, **7,** No. 3, 199-208, bibl. 8. [Received Oct., 1954]

The results are given of two experiments in which the effects of irrigation and fertilizers on potato yields were noted. In the first experiment, all plots were supplied with several fertilizers, the soil saturation being the variable. This was maintained as far as possible, at 75%, 50% or 25% saturation. With the variety Erstling, the unwatered control, the yield was 148·6 kg./100 m.² ; the highest yield, 209 kg./100 m.², was obtained from the plots at 50% saturation. The late variety, Jakobi, yielded 374 kg./100 m.² when unwatered and 511 kg./100 m.² at 50% saturation. The effect of irrigation was most noticeable in the late varieties. The second experiment showed the effect of irrigation, in conjunction with fertilizers, on the variety Jakobi. The value of soil moisture was never allowed to fall below 50% saturation. Absence of excess N reduced the yield from watered and unwatered plots. 472 and 403 kg/100 m.² were obtained from the irrigated and control plots, respectively, when 300 kg./ha. of ammonium sulphate was applied. In the absence of N the effect of irrigation was diminished and variable. The two sets of results are not directly comparable because the preceding crops and the nutrient status of the soils were different. For potatoes, 50% soil saturation appears to be the optimum. Mention is made of the values found by other workers for other crops.—M.P.

530 NETHERLANDS. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 182. Aardappels 1955. [**Choice of varieties. Pamphlet No. 182. Potatoes 1955.**] *Suppl. 3. LandbVoorl.* 1955, **12,** No. 1, 1-5.

The results are given of comparative trials on various soil-types in the Netherlands with 42 varieties of potato. The potatoes are classified as early, second-early, early-maincrop and maincrop There are brief notes on the performance and quality of each variety.—W.J.B.

531 PARKER, M. M. and others. **Pungo : a new variety of potato resistant to late blight and adapted to eastern Virginia.** *Amer. Potato J.* 1954, **31,** No. 10, 322-6. [Virginia Truck Exp. Sta., Norfolk]

A description, the origin and the characteristics of Pungo are given. This variety is medium-early, high-yielding, resistant to late blight, and makes rapid growth. Pungo usually yields more than Irish Cobbler, especially in seasons of low rainfall. If its tubers grow too large, they are inclined to be rough. This can be remedied by closer planting and lighter application of fertilizers.—E.B.O.

532 ERWIN, A. T. and others. **Osage : a new baking-type potato variety resistant to common scab.** *Amer. Potato J.* 1954, **31,** No. 10, 299-304, illus. [Iowa Agric. Exp. Sta., Ames]

The characteristics of the potato variety Osage, with a description of the plant, flower and tuber, are given. Osage (USDA seedling X 245-186 × Katahdin) is resistant to common scab (*Streptomyces scabies*).—E.B.O.

533 KRANTZ, F. A. and others. **The Osseo variety.** *Amer. Potato J.* 1954, **31,** No. 9, 273-7, illus. [Minnesota Agric. Exp. Sta.]

Information, including a description, is given on Osseo (Cobbler × Selection 56-1), an early potato variety. The yield of Osseo is comparable with that from Waseca or Red Warba. Its tubers are white, round and uniform in size, a high percentage of them being more than 2·25 in. in diameter.—E.B.O.

534 EDDINS, A. H. and MCCUBBIN, E. N. **Improvements in potato varieties and yields at Hastings, Florida.** *Proc. Soil Sci. Soc. Fla* 1953, **13,** 79-82, bibl. 5. [Potato Invest. Lab., Hastings, Florida]

Data are given of the yields of 14 potato varieties during the period 1938-53. The highest yields were given by Red Pontiac, Cherokee, Sequoia, Kennebec, Essex and Sebago ; Bliss Triumph, Chippewa, Earlaine, Green Mountain, Irish Cobbler, Katahdin, Spaulding Rose and White Rose gave yields significantly below those of Sebago. Sebago has been the leading variety at Hastings over the last 11 years ; it has superior marketing- and chipping-qualities.—P.J.B.

535 NEW SOUTH WALES Department of Agriculture. **Release of a new potato variety.** *Agric. Gaz. N.S.W.* 1954, **65,** No. 8, 448.

A new potato variety, Walanga, bred at the New England Experiment Farm, Glen Innes, N.S.W., has been released by the Department. It has a high yield, is resistant to early- and late-blight and is also drought-resistant. It has out-yielded all other varieties in trials on the Tablelands, but is not considered suitable for coastal districts as it is late in maturing.—M.P.

536 HIELE, F. J. H. van and VERVELDE, G. J. Het belang van gelijkmatig pootgoed bij de aardappelteelt. [**The importance of uniformity in seed potatoes.**] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 10, 686-94, bibl. 5, illus., English summary p. 694.

An experiment was carried out in 1953 to determine whether more selective sorting (according to weight, length of sprouts and number of sprouts) of stock seed potatoes of a given riddle size might lead to a reduction in the variation in the size of seed potatoes grown from the stock seed. Bintje stock seed (class A) potatoes of the 35-45 mm. grade were used. They were first sorted into 3 classes according to weight: 33-45 g., 45-60 g. and 60-80 g. Each of these classes was sub-divided into 3 sub-classes according to sprout-length: 0·5-1·5 cm., 1·5-4 cm. and 3-7 cm. The differences in sprout-length were artificially induced by subjecting a portion of the potatoes to darkness treatments. Each sub-class was further sub-divided into 2 groups according to number of sprouts per tuber. Thus the potatoes were finally sorted into 18 categories. The stock seed potatoes were then planted out, at a planting distance of 60 × 40 cm., in a replicated experiment on well manured soil on 14 April; the crop was harvested on 13-14 July. A control crop was grown from unsorted stock seed. Of the 3 factors tested (weight, sprout-length and number of sprouts per tuber), weight had the greatest influence on total yield and on yields of tubers of seed size (28-45 mm.). The average total yield and the average yield of seed-size tubers from the 60-80 g. class were respectively 10 and 20% greater than those obtained from the 33-45 g. grade. Corresponding figures for increases given by 0·5-1·5 cm. sprout-length class compared with the 3-7 cm. class were 7·5 and 6·0%, respectively. Differences in numbers of sprouts per tuber had no marked effect on yields of seed-size tubers but there was a greater proportion of seed-size tubers (75·2 compared with 72·3%) in crops from stock seed with the greater number of sprouts per tuber than in crops from the seed with the smaller number of sprouts. The percentage of tubers of seed size yielded by the 45-60 g. and 60-80 g. classes of stock seed was greater than that yielded by the unsorted control.—W.J.B.

537 GUIMARAES, F. F. and TORRES, C. B. Emprego de Tuberculos-semente embonecados de batata americana (*Solanum tuberosum*). [Portuguese] [**The use for seed of potatoes distorted by second growth.**] *Arch. Fitotéc., Urug.* 1953, **5,** No. 9, 283-6, bibl. 4, illus. [Esta. Exp. Hort., Rio Grande do Sul, Brazil]

Normal tubers and tubers distorted in shape by second growth were used as seed in an experiment in 1943-5 in which the yields of the two types of potatoes were compared. Both normal and misshapen potatoes were taken from the same stock of the variety Albarenis. Both types of seed potato were planted at two planting-dates each year, February-March and August-September. There was no significant effect of type of seed potato on the yields of normal potatoes or on the yields of potatoes showing signs of second growth. The total yields and the percentage of total yields showing second growth were both significantly higher with August-September than with February-March planting. There was no significant effect of type of seed on the incidence of virus diseases.—W.J.B.

538 LAKON, G. and BULAT, Helene. Die Feststellung der Keimfähigkeit der Solanaceen-Samen nach dem Topographischen Tetrazolium-Verfahren. [**The determination of germination capacity in seed of Solanaceae according to the topographical tetrazolium method.**] *Saatgutwirtschaft* 1954, **6,** No. 11, 288-90, illus.

Germination capacity as determined by the tetrazolium method is compared with that obtained from germination tests in seed of several genera of the Solanaceae, including species of the genus *Solanum*, one of which is *S. tuberosum*. The agreement by the two methods is good, in *S. tuberosum* 72 and 78%. The time-saving advantage of the tetrazolium method is particularly important in the Solanaceae because these plants frequently have hard seed-coats and, in fresh seed of *S. tuberosum*, it is not uncommon for the normal germination time of 3 weeks to be extended to 10 weeks. The seed of several species of the Solanaceae, including *S. tuberosum*, is described and illustrated.—D.B.

539 ŠKVARNIKOV, P. K. and SOLOMKO, E. A. [**Application of chemical stimulants for breaking dormancy in freshly harvested potato tubers.**] [Russian] *Izv. Akad. Nauk SSSR* (*Bull. Acad. Sci. USSR*) *Biol. Ser.* 1954, No. 5, 55-65, bibl. 5, illus. [Crimean Filial Acad. Sci., Simferopol]

The use of chemicals to break the dormancy in freshly harvested young potato tubers so that they can be planted in summer is important, especially in the hot regions of the southern USSR where early plantings are necessary because storage of tubers until mid-summer detracts from seed quality. In the Crimea, late-spring and early-autumn frosts greatly shorten the vegetative period for potatoes, and a fundamental difficulty there is the absence of means by which healthy young plants from freshly harvested tubers can be obtained during a short period of 2 or 3 weeks. Of various substances which have been tested for breaking dormancy in freshly harvested tubers, it has been claimed that the most effective are ethylenechlorohydrin, rhodamine salts and thi-

ourea. The relative merits and disadvantages of these compounds are discussed. The authors maintain that thiourea is the most satisfactory. Experiments on its effectiveness in relation to the concentration of thiourea, the duration of tuber soaking and the potato variety used are reported. (See also Solomko, *Rep. Crimean Filial Acad. Sci.*, 1953, No. 2.)—M.H.

540 JARDOUX, R. Culture hors saison. [**An off-season crop.**] *Pomme de terre fr.* 1955, **18,** No. 185, 15-17.

At Acy-en-Multien, northern France, 20 metric tons of potato tubers of the variety Urgenta, lifted on 6-8 July, were treated with Rindite at the rate of 3-4 l. per 5 tons of potatoes. Treatment took place in an hermetically closed room where liquid Rindite was evaporated during 48 hr. The seed potatoes were then pregerminated for 6 days and planted in a 10 ha. field on 20-30 July. The crop, harvested on 10-15 November, yielded 7-8 tons of tubers per ha. Although this attempt was successful, it is considered that this method of obtaining off-season potatoes has greater chances of success in the South of France.—E.B.O.

541 RANJAN, Shri and KAUR, Ravindar. **Respiratory responses in potato tubers as an index of the effect of ethylene chlorhydrin and ammonium thiocyanate.** *J. exp. Bot.* 1954, **5,** No. 15, 414-20, bibl. 5, illus. [Bot. Dep., Univ. Allahabad, India]

The variety 'Phulwa' was worked upon for respiratory studies and growth response to dormancy-breaking hormones. The hormones were used in single and double doses. The respiratory studies reveal that ethylene chlorhydrin affects only the bud areas and not the non-bud areas. The intensity of the effect of the hormone progressively decreases in the deeper layers of cells, till finally no effect is visible in the cells of the pith areas. A distinct correlation exists between the respiratory intensity and dormancy. Of the two hormones used the respiratory rates recorded for N ethylene chlorhydrin treated tubers, given in single and double doses, were the highest. Similarly the growth response to both the doses showed the maximum reduction of the dormancy period. 0·1 N ethylene chlorhydrin treatments were not effective in breaking the dormancy or in significantly altering the rate of respiration. Treatments with 0·5% ammonium thiocyanate given in single dose showed the lowest respiratory rates and the germination records showed no difference over the control. With the double dose a gradual rise in the respiratory rates was observed. The germination records also showed an earliness of 20 to 22 days over the control and single-dose treatments, respectively. Treatments with 2% ammonium thiocyanate depressed germination. The respiratory rates recorded were also low. In general the double-dose treatments showed better results than the single-dose treatments. Also, treatments on 3 weeks old tubers were more effective than on 6 weeks old tubers.—Authors' summary.

542 ROSS, J. I. G. and ROBINSON, D. B. **The effect of immersion in sea water on the sprouting of potato tubers.** *Amer. Potato J.* 1954, **31,** No. 10, 317-21, bibl. 3, illus. [Sci. Serv., Dep. Agric., Ottawa, Canada]

Immersion of dormant potatoes in sea water for periods up to 3 days at 56°F. was found to shorten the dormancy periods and increase the early growth of plants. More prolonged immersion, or the exposure of eyes that had begun to grow, resulted in a soft rot of tubers and injury to the sprouts.—Authors' summary.

543 BLOMMAERT, K. L. J. **Growth- and inhibiting-substances in relation to the rest period of the potato tuber.** *Nature, Lond.* 1954, **174,** No. 4438, 970-2, bibl. 10, illus. [W.P. Fruit Res. Sta., Stellenbosch, Union of S. Africa]

The object of the experiments reported was to determine and identify the growth- and inhibiting-substances present in the potato tuber by the method of paper chromatography. The data support the theory of Hemberg [*Acta Hort. Berg.* 1947, 14, 133; *Physiol. Plant.* 1949, 2, 24; and *ibid.* 1952, 5, 115] that the breaking of dormancy in the potato tuber is primarily due to the disappearance of an acid inhibitor. Details of this work are to be published elsewhere.—M.H.

544 TAGAWA, T. and OKAZAWA, Y. **Physiological and morphological studies on the potato plants. Pt. 16. Some contributions to the physiology of dormancy, with special reference to the interrelation between ascorbic aid, phosphorylase and phosphatase in the potato tuber during the rest period.** [Japanese] *Proc. Crop Sci. Soc. Japan* 1954, **23,** No. 1, 1-5, bibl. 10, illus., English summary p. 5. [Fac. Agric., Hokkaido Univ.]

545 BOSMAN, J. C. Phytophthorabestrijding bij de teelt van aardappelen als stoppelgewas in 1953 (project 292). [**Control of late blight (*Phytophthora infestans*) in potatoes grown as a catch crop.**] *Rep. Cent. Inst. agric. Res., Wageningen 1953* 1954, 74-8, English summary p. 78.

Copper oxychloride (10 kg. active material per ha., as a spray and as a mist) and zinc ethylene bisdithiocarbamate (12·5 kg. active material per ha., as a spray) were applied once and twice a week to potatoes planted in August. Twice-weekly applications of copper oxychloride slightly depressed

elds (compared with once-weekly applications) in rial where blight incidence was low but increased em in another trial in which incidence was high. rays and mists of the copper compound were ually effective. Plots treated with the zinc com- und gave higher yields of potatoes than those eated with the copper compound but the applica- n of the former is considered uneconomic.—W.J.B.

6 CHOUDHURI, H. C. **Spray tests for control of potato blight in the hills of West Bengal.** *Amer. Potato J.* 1954, **31,** No. 9, 263-72, bibl. 6.

ials were carried out to test Perenox, Dithane, ltosan and Perelan for controlling late blight *hytophthora infestans*) on potato crops in the hills Darjeeling under conditions of high rainfall. rayings were repeated at intervals of 6, 8, 10 and days for a total of 8 to 18 applications. Results owed that Perenox and Dithane, which were plied at rates of 1·25-5 lb. in 100-150 gal. of ter per ac., gave a better control of late blight an did the other fungicides. Spraying at intervals 6-8 days, even when employing low rates of ngicides, gave better results than spraying at ger intervals with higher rates, particularly in ne when rainfall is high. All the fungicides tested creased yields, but these increases were higher the plots treated with Perenox than in the other ots.—E.B.O.

7 ROJAS, E. and ESTRADA, R. Efecto de la N-triclorometiltiotetrahidroftalamida en el control de *Phytophthora infestans* de la papa. [**The effect of *N*-trichloromethylthiotetrahydrophthalimide on *Phytophthora infestans* in potato.**] *Inform. Tec. Minist. Agric. Div. Invest. Bogotá, Colombia* 1953, **1,** No. 1, 50-78, illus.

xperiments were carried out in 1951-3 at 3 fferent localities in Colombia to test the effect of R 406 (*N*-trichloromethylthiotetrahydrophthalide), Dithane Z-78, Bordeaux mixture and her fungicides on the tuber yield of potatoes arieties of *Solanum andigenum*) attacked by *Ph. festans*. Applications of fungicides were made at tervals of 7, 14 and 21 days. Plots treated with R 406 (at a concentration of 360 g. per 100 l. of ater) gave consistently higher yields than plots ceiving other treatments. Among treatments her than SR 406, Bordeaux mixture and Dithane 78 gave significantly better control of the disease an other fungicides.—W.J.B.

8 CALDERONI, A. V. and INDUNI, C. J. Resistencia de variedades y clones de papa a la sarna común (*Streptomyces scabies*). [**The resistance of varieties and clones of potato to scab (*Streptomyces scabies*).**] *Rev. Invest. agric., B. Aires* 1954, **8,** No. 2, 195-206, bibl. 12, illus. [Esta. Exp. Balcarce, Argentina]

A large collection of seed potatoes from S. and N. America and from Europe were grown in soil infected with *S. scabies* [*Actinomyces scabies*]. The varieties Johansen, Jubel, King George and Seneca were resistant: 13 other varieties were moderately resistant. The method of assessing resistance was that used by Stevenson in the USA.—W.J.B.

549 SCHUTT, K. Beitrag zur Chemie der Kartoffel-Welkekrankheit. [**Contribution to the chemistry of the potato-wilt disease.**] *Bodenkultur* 1953, **7,** No. 3, 268-78, bibl. 8, illus. [Received October, 1954]

Analysis of the soil around potato plants suffering from Colletotrichum wilt showed the soil to have higher concentrations of Ca, Mg and S ions than did the soil around healthy plants. The soil solution, also, had a higher osmotic pressure and, during a drought, the plants were unable to take up water. Plants consequently became susceptible to wilt, the roots and stems died and the tubers frequently lost water and shrivelled, remaining attached to the plant by mucilaginous stolons. No difference between healthy and diseased plants was noticed in the pH of the tubers and leaves. The ash contents of diseased plants showed unexpectedly high values for K and Cl ions, and low values for Ca, Mg and S ions. Potash deficiency is therefore not a factor contributing to the incidence of the disease. The adverse soil conditions can be counteracted by applications of fertilizers such as urea, triple-phosphate and salt-petre. Organic fertilizers bind the ammonia in the soil and enable water conduction to occur. All forms of fertilizers containing Ca should be avoided. A method for the rapid determination of the electrolyte content of the soil is described. This enables " diseased "soils to be distinguished from " healthy" soils.—M.P.

550 CALLBECK, L. C. **A progress report on the effect of zinc as a constitutent of potato fungicides.** *Amer. Potato J.* 1954, **31,** No. 11, 341-8, bibl. 28. [Sci. Serv. Lab., Charlottetown, Canada]

A review is given of results from 5 years' studies into the effect on late-blight control and on yield in potatoes of including zinc sulphate in the regular copper spray, and of the effect on yield of treating seed pieces in solutions of zinc salts, and of incorporating zinc compounds with the soil.—From author's summary.

551 BONDE, R. and SOUZA, P. de. **Studies on the control of potato bacterial seed-piece decay and blackleg with antibiotics.** *Amer. Potato J.*

1954, **31,** No. 10, 311-16, bibl. 2, illus. [Maine Agric. Exp. Sta., Orono]

Treating cut seed potatoes in solutions of streptomycin sulphate, or streptomycin sulphate combined with terramycin hydrochloride, is an effective method for reducing the losses from blackleg and from seed-piece decay or missing hills caused by *Erwinia atroseptica* and *Pseudomonas fluorescens*. —Authors' conclusions.

552 WASSINK, E. C. and STOLWIJK, J. A. J. **Effect of photoperiod on vegetative development and tuber formation in two potato varieties.** *Meded. LandbHogesch., Wageningen* 1953, **53,** No. 5, 99-112, bibl. 4, illus.

Two potato varieties, Alpha (late) and Bintje (moderately early), were exposed to short- and long-days in a field experiment. Short days consisted of a 10-hr. period of daylight. Long days consisted of the same 10-hr. period followed by 8 hr. supplementary light from fluorescent tubes at an intensity of approximately 120 lux. The same varieties were also grown in natural daylight. With short days, the vegetation period was shortened, and above-ground parts reached their maximum growth sooner and decayed quicker than in the case of plants grown with long and natural days. Tuber formation also started earlier in plants receiving short-day treatment than in the other plants but the weight per tuber, about 100 days after planting, of the plants receiving short-day treatment was less than that of plants receiving other treatments. The average weight per tuber of short- and long-day plants, respectively, was 15·7 g. and 6·4 g. 47 days after planting and 57 g. and 96 g. about 100 days after planting. At all harvests, it was found that in the case of plants treated with short days the above-ground parts made up a smaller percentage of the total fresh weight than in the case of the plants receiving long days or natural days.—W.J.B.

553 NIJDAM, F. E. Hoe ontwikkelt zich een stolone-achtige zijspruit van een aardappellichtkiem na het poten? [**How does a stolon-like side sprout growing from a potato sprout develop after planting**?] *Landbouwk. Tijdschr., Wageningen* 1954, **66,** No. 10, 701.

A statement is made with reference to "Exertion of influence on the sprouting of potatoes, and the practical value of such procedure for breeder and grower" by O. Fischnich in *Landbouwk. Tijdschr., Wageningen* 66, No. 8 [reported in Abs. 181.] in which the formation of stolon-like side sprouts on potato sprouts formed under the influence of 6 hr. daily periods of red light, is discussed. The behaviour of such side sprouts after planting of the tuber was then unknown to Prof. Fischnich. The author describes his own experiments in which potatoes of the variety Prudal (which had developed stolon-like side sprouts under natural light) were planted out with side sprouts labelled. At the same time, Noordeling potatoes with very short side sprouts [according to the author the tendency of potatoes to form either short or long (stolon-like) side sprouts depends upon variety] were also planted out. When the potato plants were lifted on 26 May, it was found that both types of side sprout had developed into above-ground, leaf-bearing stems.—W.J.B.

554 BOLLI, M. Sui processi di cicatrizzazione delle ferite nei tuberi di patata. [**The processes of cicatrization in wounds of potato tubers.**] *Ann. Bot., Roma* 1953, **24,** No. 2, 212-40, bibl. 32, illus., English summary pp. 238-9. [Received February, 1955]

555 HIGHLANDS, M. E. and others. **Observations on the lipid constituents of white potatoes.** *Amer. Potato J.* 1954, **31,** No. 11, 353-7, bibl. 8. [Maine Univ., Orono]

The chemical analysis of the lipid material of potatoes showed high percentages of unsaturated fatty acids, i.e., linoleic, linolenic and oleic acids. The iodine number of the fatty acids was found to be 158-160. These findings would indicate that the "off" flavour which develops in dehydrated potatoes after prolonged storage results in part from the oxidative rancidity of their lipid material. —E.B.O.

556 LUCAS, R. E. and others. **Effect of potassium carriers and phosphate-potash ratios on the yield and quality of potatoes grown in organic soils.** *Amer. Potato J.* 1954, **31,** No. 11, 349-52, bibl. 8. [Michigan Agric. Exp. Sta.]

Results from field experiments in several localities indicated that: (a) the fertilizer with 1-3 phosphate-potash ratio (100 lb. P_2O_5-300 lb. K_2O per ac.) gave the highest yield of potatoes but the potatoes contained 2% less starch than did those fertilized with a 2-1, 1-1 and 1-2 ratio fertilizer; (b) the alcohol test showed that fertilizers with a high potash content resulted in a better colour of the tubers, but these differences were not significant; (c) tubers from the plots treated with potassium chloride contained 1·3% less starch and were 6% lighter in weight than were those from plots treated with potassium sulphate; (d) the total starch produced per ac. was approximately 16% higher from potatoes treated with potassium sulphate than from those treated with potassium chloride; (e) location had a marked influence on the results from the chloride v. sulphate tests.—E.B.O.

557 WESSELS, D. G. and PRETORIUS, T. P. **Fertilizer experiments at the Vaalhartz Agricultural Research Station (1946-1950).** *Sci.*

Bull. 338. Dep. Agric. S. Afr. 1953, pp. 76, bibl. in text, illus.

tatoes, pp. 38-40. In factorial experiments rried out with potatoes it was found that three ferent levels of superphosphate had no signi- ant effect on yields. Nitrogen increased yields, t potash depressed them. High N raised the otein content, whereas high phosphate levels vered it. High potash raised the protein content ly when nitrogen was low. The starch content nained unaltered throughout the trials.—M.P.

8 RAJU, M. S. and others. **Fertilizer studies with potatoes—(studies on the reduction of manure without detriment to crop yield or the productivity of the soil).** *Madras agric. J.* 1954, **41,** No. 7, 205-16, bibl. 4. [Agric. Res. Inst., Coimbatore, India]

n experiment in 1949-52 is described in which the ect on the yield of Great Scot potatoes of the llowing manurial treatments, in all combinations, s tested : (a) N (as ammonium sulphate and ɔundnut cake) at 40 and 80 lb. per ac., (b) O_5 (as superphosphate and bone meal) at 0, 40, 0 and 200 lb. per ac. ; (c) lime at 0 and 2 ns per ac. All plots received 100 lb. K_2O per ac. me had no significant effect on yields. Reduction either N or P_2O_5 applications below the highest els (80 lb. N and 200 lb. P_2O_5 per ac.) caused nificant reductions in potato yields. The culti- tion of potatoes in Madras (chiefly in the Nilgiri ls) is briefly described.—W.J.B.

9 ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **Fixed equipment of the farm. Bulk storage of potatoes in buildings.** *Leafl. 24. England and Wales. Minist. Agric. Fish.* 1954, pp. 14, illus., 1s.

tails are given of buildings for storing potatoes der British conditions. The buildings described e either shallow (for storing potatoes up to 8 ft. ep) or deep (for storing in layers more than 8 ft. ep). Special attention is paid to methods for ɔviding forced-draught ventilation where late- son storage is contemplated. Other practical ɔects of potato storage discussed are electrical tallations, mechanized loading and storage ɪperature. The use of refrigeration in potato rage is not discussed.—W.J.B.

) THIELEBEIN, M. Die Kartoffellagerung. [**Potato storage.**] *Dtsch. landw. Pr.* 1954, **77,** No. 21, 296. [Forschungsanstalt für Landwirtschaft, Braunschweig, W. Germany]

e loss of the potato harvest during storage may 30% or more. The greatest loss is in fodder atoes, which should be immediately ensiled. ɪperature is the decisive factor in successful ato storage. If stored for food, the temperature uld be below 6°C. to prevent sprouting of tubers, but above 0°C. to prevent the potatoes from becoming sweet and of unpleasant flavour. Trials with several potato varieties stored for seed gave the following results. A temperature of 1°C. prevented sprouting of tubers in all varieties. When stored at 4°C. some varieties showed a tendency to sprout, and at 7°C. tubers of all varieties sprouted. While a continuous temperature of 7°C. was unsuitable, a temperature which alternated between 7°C. and a lower one [not named] was satisfactory. The barn type of storage is recommended in order to facilitate the regulation of storage temperature. —D.B.

561 JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY. **Radiation sterilization of foods.** *J. agric. fd Chem.* 1954, **2,** No. 25, 1260-6, illus.

Observations are made on the possibility of using ionizing radiations, obtained from radioactive sources or from linear accelerators, for inhibiting the sprouting of potatoes during storage. An illustration is given of a projected processing plant capable of irradiating about 250 bu. of tubers per hr. at a cost of 0·7 cents per bu. This is quoted as being able to treat potatoes so that they can be stored for at least one year without danger of rotting or sprouting.—P.J.B.

562 LETNES, A. Nytt, grohemmende middel. Malein hydrazid (MH) er mest anvendelig ved lagring av grønnsaker. [**New growth-inhibiting substance. Maleic hydrazide is most applicable for use with stored vegetables.**] *Norsk Landbr.* 1954, **20,** No. 24, 522, illus.

In trials in Norway, potato plants were sprayed on 13 August with 0·5 l. per decare (0·1 ha.) of 30% maleic hydrazide and harvested on 6 October. Yields from treated and untreated crops were 4135 and 4349 kg. of tubers per decare with a starch content of 20·5 and 21·1%, respectively. The tubers were then stored in a cellar at a relatively high temperature from the end of February onward. Storage losses during the period 25 October to 18 January for treated and untreated tubers were 12·6 and 12·4% and during the period 18 January to 6 July, 19·5%, 29·7 and with 1·0 and 1·8% rotted tubers, 2·8 and 13·3% of sprouted tubers and a starch content on 6 July of 20·3 and 21·4%, respectively. The untreated tubers were very shrunken by 6 July, while those from the plants treated with maleic hydrazide were still firm and of good culinary quality.—P.J.B.

563 WENZL, H. Kälteschäden und Schwarzpunkt-Fleckenkrankheit (*Colletotrichum atramentarium*) der Kartoffelknollen. [**Frost damage and black-dot disease (*Colletotrichum atramentarium*) of the potato tuber.**]

PflSchBer. 1955, **14,** No. 1/4, 1-22, bibl. 27, illus. [Bundesanst. Pflanzenschutz, Wien, Austria]

Sprouting of stored potato tubers was greatly weakened by the presence of skin spots, resulting, in the first place, from the action of frost on stored potatoes which had been insufficiently protected against cold. The spots became the seat of infection by *Colletotrichum atramentarium,* which intensified the damage.—D.B.

564 SCHWIMMER, S. and others. **Potato composition. Survey of major and minor sugar and starch components of the white potato.** *J. agric. fd Chem.* 1954, **2,** No. 25, 1284-90, bibl. 26. [West. Util. Res. Br., Agric. Res. Serv., U.S. Dep. Agric., Albany 6, Calif.]

Data are given of the changes in the sugar and starch components of potatoes, as indicated by quantitative chemical and qualitative chromatographic methods, of the tubers of 5 varieties during different periods of storage at different temperatures. Chromatographic analyses confirmed that the main sugars present were glucose, sucrose and fructose and that fructose content was the most responsive to temperature changes in storage. Sugar content rose during storage at low temperatures and fell during subsequent conditioning at high temperatures. Storage at low temperatures caused an initial rise in sucrose content, followed by a rise in the content of other sugars. Observations are made on the presence of sugars other than those mentioned above, on starch and iodine-blue values and on starch-dispersion procedures.—P.J.B.

565 STEVENSON, F. J. and others. **Potato utilization in relation to variety (heredity) and environment.** *Amer. Potato J.* 1954, **31,** No. 10, 327-40, bibl. 5. [Hort. Crops Res. Br., U.S. Dep. Agric., Beltsville, Md]

In this review of potato utilization in the USA, the main character considered is the percentage of solids, or dry-matter content, which is determined by the interaction of hereditary factors and environment.—E.B.O.

566 SWISS ASSOCIATION FOR THE TESTING AND DISTRIBUTION OF SEED POTATOES. Dix-septième rapport d'activité. **[17th Progress report, 1 July, 1952 to 31 October, 1953.]** [n.d.], pp. 52. [Brougg] [Received Nov., 1954]

A general account is given of the potato industry in Switzerland. The results of trials carried out in 1952 at various agricultural schools and centres are fully tabulated in respect of : yield, tuber-size, dry-matter and starch contents, degree of blackening after cooking, vegetation stages, disease incidence and resistance and valuation of the morphological features of the tubers of the different varieties. Brief notes are given on the varieties. The early varieties on trial were : Atlanta, Concordia, Corona, Erntedank, Sieglinde and Bintje. In all the trials, Bintje, the control variety, was superior to the others. The late varieties on trial were : Agnes, Fichtelgold, Apta, Virginia and the control variety, Erdgold, but none gave fully satisfactory or consistent results. The drought during the summer of 1952 increased the proportion of very small tubers in the early varieties, and in most cases reduced yields.—M.P.

SWEET POTATO

567 HUERTA, A. de la and NAVARRO, E. Variedades de batatas. [**Varieties of sweet potato.**] *Publ. Inst. Nac. Invest. Agron., Madrid* 1954, pp. 53, illus.

Twenty-six varieties of sweet potato (*Ipomoea batatas*) grown in southern Spain are described. The descriptions are each accompanied by photographs of leaves and tubers. In the case of each variety, average figures are given for yield per ha. of leaf and tuber and the content of dry matter, starch, saccharose, glucose and total sugars in the tuber.—W.J.B.

568 GUNEWARDENA, K. J. **A note on the characters and performance of some sweet potato varieties.** *Trop. Agriculturist* 1954, **110,** No. 1, 36-8. [Exp. Sta., Peradeniya, Ceylon]

In a replicated experiment the yields of 10 varieties of sweet potato (*Ipomoea batatas*) were compared. The variety B5 yielded a significantly greater weight of tubers than V52, Wannop, Gandia, White Maltese and Murisee. There were no significant differences between the yields of B5, Yellow, Sumar Big Yellow and Gona Murisee, although B5 yielded more than any other variety.—W.J.B.

569 POOLE, W. D. and HERNANDEZ, T. P. **Chemical weed control in sweet potatoes.** *Down to Earth* 1954, **10,** No. 1, 6-7, illus. [Louisiana State Univ.]

The results are given of pre- and post-planting weed-control trials on sweet potatoes [*Ipomoea batatas*]. Post-planting treatments with DNOSBP were liable to damage the plants. Pre-planting treatments were carried out over a 3-year period, using a number of herbicides, including DNOSBP (Premerge), CMU, CIPC and N-1 naphthylphthalamic acid, combined with either hand- or machine-planting. In most cases, machine-planted plots outyielded hand-planted plots. Applications of DNOSBP, applied before planting, in bands 16-18 in. wide over the rows at a rate of 4 or 8 lb. per ac., appeared to give the most consistently good

veed control and were recommended as a weed control treatment for Louisiana conditions.—P.J.B.

570 Sherman, M. and Tasmashiro, M. **The sweetpotato weevils in Hawaii. Their biology and control.** *Tech. Bull. 23. Hawaii agric. Exp. Sta.* 1954, pp. 36, bibl. 58, illus.

571 Howell, M. J. and Wittwer, S. H. **Chemical induction of flowering in the sweetpotato.** *Science* 1954, **120,** No. 3122, 717, bibl. 4.

A note is given on the effect on flowering of 100 and 500 ppm. concentrations of 2,4-D applied as foliar sprays to sweet potatoes (*Ipomoea batatas*) on 4 September, or 4 October, after the roots had begun to enlarge. Porto Rico plants sprayed with 500 ppm. 2,4-D on 4 September or 4 October produced flowers on 7 November, while Gold Rush plants did not flower. Applications of 100 ppm. 2,4-D on 4 October to Porto Rico did not induce flowering, while in the case of Gold Rush, flowering began on 9 November. In all cases flowering was general. The presence of relatively small, or non-enlarged, roots on the plants appeared to be associated with successful treatments.—P.J.B.

572 Jenkins, W. F. and Moore, E. L. **The distribution of ascorbic acid and latex vessels in three tissue regions of sweetpotatoes.** *Proc. Amer. Soc. hort. Sci.* 1954, **63,** 389-92, bibl. 5, illus. [Mississippi Agric. Exp. Sta., State College]

Determinations were made of the ascorbic-acid content and distribution of latex vessels in the pericyclic, outer cambial and central regions of Unit 1 Porto Rico, Allgold and Goldrush sweet potato storage roots. The mean ascorbic-acid contents of the pericyclic, outer cambial and central regions of all varieties were 8·1, 26·7 and 21 mg. per 100 g. tissue, with mean contents in all parts of the tissue of 16·98, 18·69 and 19·26 mg. for Porto Rico, Allgold and Goldrush, respectively. The mean number of latex vessels per 20 sq. mm. of surface averaged 12 and 3·5 for the outer cambial and central regions of all varieties, with mean numbers of 6·2, 8·6 and 8·5 for the outer cambial and central regions of Porto Rico, Allgold and Goldrush, respectively. From these results, it was concluded that ascorbic acid in sweet potato roots was indirectly associated with cambial tissues, rather than latex vessels, parenchyma, or storage tissues, and that it was associated with, but not directly proportional to, the number of latex vessels.—P.J.B.

573 El-Kattan, A. A. and Stark, F. C. **Tissue activity and structural differences in the storage roots of Maryland Golden and Jersey Orange sweetpotatoes as related to cracking.** *Proc. Amer. Soc. hort. Sci.* 1954, **63,** 378-88, bibl. 11, illus. [Agric. Exp. Sta., College Park, Md]

Cracking of sweet potatoes [*Ipomoea batatas*] in storage was a very serious problem along the entire Atlantic seaboard of the USA in 1949. The present studies were made to correlate histological differences between sweet potato varieties with the incidence of cracking in them, to describe tissue changes attendant on cracking and the cellular activity associated with the healing of cracks. In 1949, the average number of cracked roots of all sizes was 26·1% for Maryland Golden, compared with 7·4% for Jersey Orange. Cracking appeared to be due to rupture of the inactive tissues outside the vascular cylinder, caused by pressure exerted by the enlarging vascular cylinder. Under favourable conditions for healing, the root surface becomes almost normal if sufficient time elapses before harvest. Inactivity of the outer tissues is considered likely to be due to an unfavourable condition of drought. Jersey Orange roots were more active than Maryland Golden, as measured by callus formation ; under dry conditions, Jersey Orange roots remained active, while Maryland Golden roots became completely inactive. Jersey Orange roots had smaller xylem vessels, more parenchyma, a wider cambial ring and more units of secondary cambium than Maryland Golden. The relatively lower rate of tissue activity of Maryland Golden is thought to account for its inferior capacity to heal wounds caused by harvesting and its poor storage quality, compared with Jersey Orange.—P.J.B.

FIBRE CROPS

COTTON

574 Adams, N. H. **Cotton growing in the Burdekin district** [**Queensland**]. *Qd agric. J.* 1954, **79,** No. 5, 249-57, illus.

Advice is given on soils, choice of varieties, sowing, thinning, cultivation, irrigation, mechanical harvesting, etc.—M.P.

575 George, J. da F. Possibilidades algodoeiras da Guiné Portuguesa. [**The possibilities of cotton-growing in Portuguese Guinea.**] *Bol. cult. Guiné Port.* 1951, **6,** No. 23, 500-89, bibl. 28, illus. [Received 1954]

The possibilities of more extensive cultivation of cotton in Portuguese Guinea are considered in detail under the following heads : climate ; soil ; the state of the cotton-growing industry at present (geographical distribution, methods used, pests, quality of the product and economic importance of the industry) ; possibility of expanding the cotton-growing industry. The article is accompanied by detailed maps. The Gabú, Bafatá, Farim and

Mansoa districts (the north-eastern zone of the country) are all climatically suitable for the development of cotton-growing : the soils in these districts suitable for cotton-growing are defined. Much of the region is suitable for mechanized agriculture.—W.J.B.

576 NAYAK, H. R. **Studies in the quality and agronomic characters of cotton grown with different spacings and seed rates.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 3, 207-16, bibl. 8. [Cott. Res. Lab., Nanded]

The cotton variety Jaywant (*Gossypium herbaceum*) was grown in 1945-8 at 3 different plant spacings (18, 24 and 36 in.) and at 3 different seed rates (8, 10 and 12 lb. per ac.). The effects of spacing and seed rate on mean fibre-length, mean fibre-weight per in., ginning percentage, lint index, 100-seed weight and yield of seed cotton per ac. were studied. Fibre length was not significantly affected by either spacing or seed rate but there was a tendency for length of fibre to be less with 36 in. than with other spacings. Over the 3 years of the experiments relatively high rainfall was associated with relatively low average fibre lengths. There was a tendency for fibre weight to be reduced at 36 in. spacings and 12 lb. seed rates, compared with other spacings and seed rates. Spacings of 36 in. gave higher yields of seed cotton than other spacings during 2 seasons and 18 in. spacings gave the lowest yields in all seasons. The 8 lb. per ac. seed rate gave significantly higher yields of seed cotton than other seed rates in all seasons. Ginning percentage and lint index were not significantly affected by spacing or seed rate. The 100-seed weight was significantly reduced by the 18 in. compared with other spacings in 2 out of the 3 seasons.—W.J.B.

577 KALYANARAMAN, S. M. and others. **A note on the range of adaptability of four long linted Karunganni cotton strains.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 3, 189-95, bibl. 3, illus. [Agric. Dep. Madras]

Four improved long-linted Karunganni strains of *Gossypium arboreum*, known as 6186-9, 6188-8, 6312-4 and 6874, were compared with local Karunganni varieties in respect of seed-cotton yield, halo length and ginning percentage in numerous trials during the 1952-3 season on cultivators' holdings in the central and southern districts of Madras. The halo length of the improved strains was significantly better than that of local varieties in both central and southern districts. The ginning percentage of the improved strains was in general greater than that of local varieties. However, the improved strains did not give greater yields of seed cotton than the local varieties.—W.J.B.

578 KALYANARAMAN, S. M. **Recent progress of cotton research in Madras (1950-1953).** *Indian Cott. Gr. Rev.* 1954, **8,** No. 4, 256-62 illus.

An account is given of the breeding of new cotto varieties in Madras State and of trials in which th performance of established varieties in differen parts of the state has been tested. At Coimbatore among winter-sown Cambodia cottons, the new varieties 9030 and 0734 were superior to Madra Cambodia Uganda-1 in quality, and equal to it i yield. At Pattambi, South Malabar, a Sea Islan variety, Montserrat, has been successfully grown The results of trials with numerous varieties i different zones of Madras State are presented, i tabular form, under the heads : yield of seed cotton ginning percentage, halo length and fibre weigh per in.—W.J.B.

579 KELKAR, S. G. and KAIWAR, S. R. **Laxm cotton from Karnatak.** *Indian Cott. Gr. Rev* 1954, **8,** No. 4, 263-74, bibl. 3, illus.

Trials in 1946-52 in the Bombay Karnatak, in which Laxmi, a variety of *Gossypium hirsutum*, was compared with Gadag No. 1, formerly the standard variety of *G. hirsutum* for the region, are reported Laxmi gave markedly better results than Gadag No. 1 and is already in extensive use. Compared with Gadag No. 1, Laxmi gave, on an average, a 20% greater yield of seed cotton per ac., 34% more lint per ac., a ginning percentage higher by 3·4% and a 12·7% longer staple.—W.J.B.

580 SAHASRABUDHE, V. B. and SIMLOTE, K. M. **A note on the performance of Malwi 9 in Malwa.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 4, 275-9, bibl. 1. [Inst. Pl. Industr., Indore]

The performance, on the Malwa plateau, of the cotton variety Malwi 9 (considered suitable for the region but susceptible to *Fusarium vasinfectum* wilt) was compared with that of the more recently introduced, wilt-resistant varieties Bhoj (formerly Dhar 43) and Jarila, and another improved variety M9-20. M9-20 yielded, on the average, more, but not significantly more, than Malwi 9. In 21 experiments in which Malwi 9 and Jarila were compared, the average yields of seed-cotton by the two varieties, respectively, were 388·4 and 389·6 lb. per ac. The average yields for the same two varieties, when 5 experiments on wilt-infested land were left out of consideration, were 440·6 and 389·5 lb. per ac. In 21 trials in which the yields of seed-cotton from Malwi 9 and Dhar 43 were compared, the latter variety yielded, on an average, slightly more than the former, but, when experiments on wilt-infested land were left out of consideration, there was scarcely any difference between the average yields of the two varieties.—W.J.B.

581 ANSARI, M. A. A. and others. **M-100 an improved variety of cotton.** *Pakist. Cott. Bull.* 1953, **2,** No. 3, 10-13.

M-100, a new variety of *Gossypium hirsutum* suitable for the Sind region of Pakistan, is described and and compared with M-4, the *G. hirsutum* variety commonly grown in Sind. In comparative trials in 1949-53, M-100 outyielded M-4 by an average yield of 1·4 maunds (1 maund = 82·29 lb.) of seed cotton per ac.—W.J.B.

582 CARVALHO, M. de. Resultados nos ensaios comparativos de variedades 1949-50 a 1951-52. [**Results of varietal trials (with cotton) 1949-52.**] *Mem. Trab. 14. Cent. Invest. Cient. Algod., Lourenço Marques, Mozambique* 1954, pp. 85, English summary p. 85.

A detailed report is given of comparative trials with cotton varieties at 3 experimental stations in Mozambique in 1949-52. Assessment of the performance of varieties in the trials was carried out on the basis of yield of seed cotton, ginning outturn, production of cotton fibre per ha. and jassid resistance. At Namapa the variety A2106 gave the highest average yield of seed cotton (580 kg. per ha.), while the variety BP 50 gave the highest average yields at Chemba and Maniquenique (376 and 1377 kg. per ha. respectively).—W.J.B.

583 SCHMITZ, G. Causes d'altération des graines de coton. [**Causes of deterioration of cotton seed.**] *Bull. agric. Congo belge* 1954, **45,** No. 4, 971-86, bibl. 4, illus. [Sta. Rech. Agron. INÉAC, Bambesa, Belgian Congo]

Information is given on physiological, fungal and entomological causes of deterioration in cotton seed and the effect of this deterioration on the germinating capacity of the seed.—E.B.O.

584 DASTUR, R. H. and PRAKASH, V. **The responses of the cotton plants to some growth regulating substances. 1. The effects on morphological characters.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 3, 173-88, bibl. 12, illus.

The response of pot-grown cotton plants to sprays and soil treatments with various concentrations of 2,4-D, 2,3,5 tri-iodo benzoic acid (TIBA), naphthalene acetic acid (NAA), naphthoxy-acetic acid (NPA) and β-indole-butyric acid (IBA) was studied in investigations during 1949-52. The American Upland variety Indore 1 and the *G. arboreum* variety Malvi 9 were used. IBA and NAA were applied as sprays to 1-month-old plants at concentrations of 10, 20 and 30 mg. per l., TIBA at 50, 100 and 150 mg. per l. and 2,4-D at 0·01, 0·1 and 1·0 mg. per l. Each treatment was compared with an untreated control. NPA was not used after a preliminary trial in which it gave results almost identical with those obtained with NAA. The hormones mentioned above were also applied to the soil in which one-month-old plants were growing, at rates equivalent to the spray concentrations already mentioned. The results of the experiments are summarized as follows. TIBA applied either as a spray or to the soil made plants shorter and bushy. There was a significant decrease in internodal lengths, most marked at the highest hormone concentration. Spraying significantly increased the number of bolls per plant in Indore 1 at all concentrations and in Malvi 9 at the lowest concentration. Yields of seed cotton were increased, but not consistently, by applications of TIBA. 2,4-D, applied as a spray or added to the soil, significantly increased the number of monopodial branches per plant in both varieties at all concentrations. 2,4-D increased the number of flowers per plant but had no significant effect on yields of seed cotton. The size and shape of the leaves, flowers and bolls were changed by applications of 2,4-D in any form. NAA had no consistent effect on the vegetative growth of cotton plants but generally increased the setting percentage, in many cases to a significant extent. The yield of seed cotton per plant was also generally increased, although not consistently. IBA sprays decreased the internodal length of stems and plant height to an increasing extent with increasing concentrations. Soil applications did not have the same effect. IBA sprays (but not soil applications) decreased the number of flowers and increased the setting percentage. In general, the effect of IBA on yields of seed cotton was not significant.—W.J.B.

585 YOUNG, M. T. and GAINES, R. C. **Control of insects and spider mites on cotton in 1953 [in Louisiana].** *J. econ. Ent.* 1954, **47,** No. 5, 753-6. [Ent. Res. Br., U.S. Dep. Agric.]

586 WALKER, J. K. and others. **Evaluation of interval and dosage in bollworm control.** *J. econ. Ent.* 1954, **47,** No. 5, 824-6, bibl. 2. [Texas Agric. Exp. Sta., College Station]

DDT applied every 5 days at the rate of 1·5 lb. of active ingredient per ac. resulted in a significantly better bollworm (*Heliothis armigera*) control and a significantly greater yield of cotton than the same amount of DDT applied at 7- or 10-day intervals, or 0·75 lb. of DDT per ac. applied every 5 or 7 days. Significantly better bollworm control and greater yields were obtained from all these treatments than from the untreated plot. Significantly better bollworm control was also obtained when Toxaphene-DDT, or Dieldrin-DDT, were applied every 4 days, instead of every 8 days.These preparations, when applied every 4 days, were more effective than Aldrin-DDT applied every 4 days. Applications of Aldrin-DDT applied at 4- and 8-day intervals were equally effective. All these preparations were equally effective when applied every 8 days.—From authors' summary.

587 MARTIN, D. F. and MISTRIC, W. J. **Endrin spray for bollworm control.** *J. econ. Ent.*

1954, **47,** No. 5, 827-9, bibl. 4. [Texas Agric. Exp. Sta., College Station]

Two small-plot field experiments were carried out to compare Endrin and Endrin-DDT sprays with Toxaphene-DDT, γ BHC-DDT and EPN-DDT for controlling the bollworm (*Heliothis armigera*) on cotton. Endrin was tested at the rate of 0·25 to 0·53 lb., Endrin-DDT (1-1) at 0·48 lb. and Endrin-DDT (1-2) at 0·75 lb. of active ingredient per ac. All treatments gave almost equal control and significant increases in the yield of seed cotton over the untreated plot, but there were no significant differences in yield between any of the treatments.—E.B.O.

588 MERKL, M. E. and DUNNAM, E. W. **Tests against cotton pests with some new dust and spray formulations.** *J. econ. Ent.* 1954, **47,** No. 5, 869-71, bibl. 1. [Ent. Res. Br., U.S. Dep. Agric.]

New dust preparations containing BHC + DDT, Toxaphene or Dieldrin and 23-90% calcium carbonate showed excellent dusting qualities and gave good control of cotton insects. Two new P compounds, OS-1836 (2-chlorovinyl diethyl phosphate) and OS-2046 (2-carbomethoxyisopropenyl dimethyl phosphate), used in sprays, were promising. Chlorthion compared favourably with Aramite and Demeton for controlling the desert spider mite (*Tetranychus desertorum*).—E.B.O.

589 STEVENSON, W. A. and KAUFFMAN, W. **The cotton leaf perforator and its control in the southwest.** *J. econ. Ent.* 1954, **47,** No. 5, 941-2.

In several field trials in 1953 treatment with 15%Toxaphene + 5% DDT was more satisfactory than DDT alone for controlling the cotton-leaf perforator (*Bucculatrix thurberiella*) on cotton. Endrin, applied as an emulsion spray at the rate of 4 gal. per ac., or as 2% dust at 20 lb. per ac., proved to be highly effective.—E.B.O.

590 BARBOSA, A. J. da S. *Ischiodon aegyptium* Wied. (Syrphidae, Diptera) : Notas breves sobre a sua biologia e o seu valor no control biológico dos afideos do algodoeiro. [***Ischiodon aegyptium* Wied. (Order, Diptera : family, Syrphidae) : brief notes on its value in the biological control of the cotton aphid.**] *Mem. Trab. 9. Cent. Invest. Cient. Algod., Lourenço Marques, Mozambique* 1953, pp. 332, bibl. 5, illus., English summary pp. 328-32.

591 COURY, T. and others. Estudos sôbre o " vermelhão " do algodoeiro 3. [**Studies on vermelhão in cotton.**] *Ann. Esc. Agric., Queiroz* 1953, **10,** 83-94, bibl. 7, English summary pp. 92-3. [Esc. Agric. Luiz de Queiroz, Brazil]

The symptoms of the cotton disease known in Brazil as vermelhão, which has been attributed by some workers to potash deficiency [see *Fld Crop Abstr.* 6 : 710], are briefly described. Plants affected by the disease lose their leaves, which turn a dark purplish-red colour prematurely, and give sub-normal yields. The following tests and experiments with cotton plants were carried out in an attempt to discover the causes of vermelhão : (a) pot experiments using soil from the districts affected by the disease ; (b) pot experiments in which the water supply was varied ; (c) pot experiments using pure sand to which 2 nutritive solutions, deficient in K and Mg, respectively, were added ; (d) leaf analysis of plant material collected from the affected districts ; (e) a field experiment, on sandy soil in the affected region, in which cotton was grown on soils to which various types of fertilizers were added. The fertilizer treatments in (e) were : (1) NPCaMg (no K, Mg supplied as $MgSO_4$); (2) NPKCa (no Mg) ; (3) NPKCaMg (complete fertilizer, Mg as $MgSO_4$) ; (4) complete, as in (3), but with Mg supplied as dolomitic limestone. A basal dressing of cotton-seed cake was applied. The authors concluded from the results of experiments (a), (b), (c) and (d) that Mg deficiency in the soil was responsible for the simultaneous appearance of a purplish-red colour in all parts of the leaf, except the veins, characteristic of vermelhão. A deficiency of K in the soil gave rise to a rusty-grey colour which first appeared at the edges of the leaf. Both symptoms appeared in plants grown in experiment (a) : the soils were more deficient in Mg than in K. Water deficiency aggravated the symptoms. The results of the field experiment (e) are given in detail. There was a highly significant increase in the incidence of vermelhão in plots where no Mg was applied, compared with all other plots. Symptoms of K deficiency were evident where no K was applied. Significantly greater yields of seed cotton were obtained with treatments (3) and (4) (complete fertilizers) than with treatments (1) and (2).—W.J.B.

592 GUBANOV, G. [**Physiological processes in the ripening and opening of cotton bolls.**] [Russian] *Hlopkovodstvo* (*Cott. Prod.*) 1954, **4,** No. 8, 47-53, illus. [Physiol. Lab., Cent. Select. Sta., All-Union Sci. Inst. Cott. Res.]

Many cotton bolls open late and are shed under the action of autumn frost. Late opening of bolls is sometimes connected with unfavourable weather during the period of ripening, and it is postulated that weather conditions which affect the rate of drying in the valves [loculi] of the boll play a dominant role in boll opening. This is said to be true only at the final stage of boll opening when the valve cells lose their turgor. The capacity of

he plant to maintain a normal water regime in the valves of the boll for a prolonged period often inders early ripening. This hindrance is effected by certain agrotechnical measures, e.g., by applying arge amounts of N to the soil, or by increasing he irrigation rate. On the other hand, some cultural measures accelerate the rate of boll ripening, e.g., deficient water or nitrogen supplies and, notably, the removal of leaves at the end of the vegetative period. The author's study is concerned with certain physiological processes in the plant which influence loss of turgor in cellular tissue, the desiccation which ensues and results in the opening of the boll. Loss of water in the inner layer of the valve is closely related to decrease in moisture of seed and lint, which decrease, in turn, is closely connected with oil content in the seed and cellulose n the lint. The formation of these substances increases with dehydration. The intensive deposition of cellulose and oil begins about the 30th to 35th day of boll growth, when gradual desiccation occurs n the seed, the lint, and the inner layer of the valve. There is evidence that cellulose formation in he hair is accompanied by intense utilization of soluble carbohydrates, especially monosaccharose. The data are tabulated as follows : (1) content of soluble carbohydrates and water in the boll of the cotton variety 108-F [species of *Gossypium* not stated] at different growth stages (35 to 68 days) under varying norms of irrigation ; (2) ditto, under different amounts of ammonium nitrate, in kg. N/hectare ; and (3) content in the hair of soluble carbohydrates and water (in controls and in defoliated plants) of the cotton varieties 108-F and C-460.—M.H.

593 McMichael, S. C. **Glandless boll in Upland cotton and its use in the study of natural crossing.** *Agron. J.* 1954, **46,** No. 11, 527-8, bibl. 3, illus. [U.S. Cott. Fld Sta., Shafter, Calif.]

Observations are made on the value of the glandless-boll character in *Gossypium hirsutum* for indicating the extent of cross-pollination in crops and for varietal identification. This character is completely recessive and can be detected from the time of seed germination up to plant maturity.—P.J.B.

594 Green, J. M. and Jones, M. D. **Isolation of cotton for seed increase.** *Agron. J.* 1953, **45,** No. 8, 366-8, bibl. 4, illus. [Oklahoma Agric. Exp. Sta., Stillwater]

Data are given showing the extent of natural crossing in cotton in Oklahoma. Percentages of hybrids produced between strains spaced at nil, 1, 2, 5 and 10 rods (1 rod = 5·5 yd.) were 19.5, 5, 4·7, 2 and 0·6%, respectively. Border rows of cotton appeared to be more effective in reducing crossing than border rows of maize. From these results, tabulated recommendations are given showing the distances to be maintained between crops of cotton grown for seed and the number of border rows to be discarded in the production of different grades of seed.—P.J.B.

595 Finkner, M. D. **Random activity of pollen vectors in isolated plots of Upland cotton.** *Agron. J.* 1954, **46,** No. 2, 68-70, bibl. 10. [N. Carolina Agric. Exp. Sta., Raleigh]

596 Nayak, H. R. **Studies on the quality and agronomic characters of cottons grown under different manurial treatments.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 4, 281-95, bibl. 11.

The effect of various manurial treatments on the following fibre properties and agronomic characters of cotton was studied in 3 experiments : (1) mean fibre length, (2) mean fibre weight per in., (3) ginning out-turn, (4) lint index, (5) 100-seed weight, (6) yield of seed cotton per ha. In the first experiment, in 1945-8, Jayawant cotton was grown with : (a) no manure ; (b) 2·5 tons farmyard manure per ac. ; (c) 2·5 tons farmyard manure per ac. plus 60 lb. per ac. ammonium nitrate ; (d) 2·0 tons per ac. farmyard manure plus 287 lb. per ac. groundnut cake. Manuring gave a significantly greater 100-seed weight than no manures. The application of farmyard manure (b) gave a lower 100-seed weight than the other manurial applications. The ginning percentage for the 4 treatments mentioned was 28·3, 27·8, 27·2 and 27·1% : the no-manure treatment gave a significantly higher ginning percentage than manurial treatments. The treatments did not significantly affect fibre length, fibre weight or lint index. In general, the highest yields of seed cotton were obtained with the treatments which included ammonium nitrate (c) and groundnut cake (d). Yields significantly higher than those obtained with no manure or with farmyard manure only were obtained in all years by the use of treatment (c) and in 2 years out of 3 by treatment (d). In the second experiment, in 1946-8 Jayawant cotton was grown with applications of groundnut cake at rates of 0, 20, 40 and 60 lb. N per ac. Fibre length was the only character significantly affected by the treatments: the application of groundnut cake at the 60 lb. level of N application gave significantly reduced fibre length, compared with the other treatments. In the third experiment, in 1946-8, 4 varieties, K.F.T. 12-2-5, 2-3-41, Jayawant and Jayadhar were used and groundnut cake was applied at rates of 0, 20, 40, 60, 80 and 100 lb. N per ac. The manurial treatments had no significant effects on fibre qualities. The varietal differences in fibre length and fibre weight, which were significant, are described.—W.J.B.

597 Guttierrez, M. Influencia de las fallas de plantas sobre el rendimiento del algodón en

las experiencias de campo. [**Influence of skips, or missing row-segments, on the yield of cotton in field experiments.**] *Rev. Invest. agric., B. Aires* 1954, **8,** No. 2, 149-50, bibl. 4, English summary pp. 158-9. [Agric. Exp. Sta. "La Banda," Prov. Santiago del Estero, Argentina]

598 MOKASHI, V. K. **Studies on sampling for estimation of cotton acreage.** *Indian Cott. Gr. Rev.* 1954, **8,** No. 3, 217-22, bibl. 3. [Inst. Pl. Industr., Indore]

FLAX

599 LORENT, J. Essais sur le lin à fibre. [**Trials with fibre flax.**] *Rev. Agric., Brux.* 1954, **7,** No. 11, 1318-22. [Sta. Rech., Gembloux, Belgium]

These experiments were conducted in 1953 only. Of the 12 varieties under trial and compared with Arc-en-ciel as standard, only one, Wiera, was classed as superior to it. Optimal cultivation conditions were investigated for Arc-en-ciel, which was put into cultivation only recently. Under different densities of sowing (2750, 3000 and 3250 seeds per $m.^2$) the difference in yield was not significant, but there was a marked decrease in resistance to lodging as density of sowing increased. Results of manuring trials were not significant, but resistance to lodging decreased with increasing N-manuring.—D.B.

600 KOOPMAN, M. J. F. and de TEMPE, J. **Comparison of laboratory evaluation and field performance of flax seed.** *Proc. internat. Seed Test. Ass.* 1954, **19,** No. 1, 24-31. [Rijksproefsta. Zaadcontrôle, Wageningen, Netherlands]

In trials with over 200 samples of flax seed, it was calculated that a reduction of 1% in germinating capacity, as indicated in the laboratory, was associated with a reduction of stands in the field of about 1%. During these trials, the weather was cold and dry during the early part of the growing season, and resulted in an abnormally high incidence of infection by *Botrytis cinerea.* Field stands were reduced by 7% for every 1% of *Botrytis*-infected seed as determined in germination tests. Field stands were reduced by about 1% for each 1% of seed heavily damaged by threshing and by about 0·3% for each 1% of lightly-damaged seed. The importance of the presence of *B. cinerea* on seed is stressed, though the use of seed treatments reduces the risk to a relatively low value, except where infection is severe.—P.J.B.

601 FRIEDERICH, J. C. Hagelschade of insectenbeschadiging in vezelvlas. [**Hail damage or insect attack in flax.**] *LandbVoorl.* 1954, **11,** No. 10, 479-80, illus.

The close resemblance between the distortions in flax plants caused by hailstorms and those caused by the stem eelworm (*Ditylenchus dipsaci*) is pointed out.—W.J.B.

KENAF

602 GANGSTAD, E. O. and others. **The culture of kenaf in South Florida.** *Proc. Soil Sci. Soc. Fla* 1951, **11,** 143-7. [Everglades Exp. Sta., Belle Glade, Florida] [Received January, 1955]

Notes are given on the cultivation of kenaf [*Hibiscus cannabinus*] in Florida and the results are given of a number of agronomic trials in 1950. The data include : (a) those showing the plant height, stem diameter and fibre content of kenaf at 75, 100, 125 and 150 days old from sowings at 5 different dates on Everglades peat soil, (b) those showing plant height, plant population, total green weight per ac., fibre content and fibre yields from sowings in rows 7 in. apart at rates of 10, 20 and 70 lb. seed per ac. and (c) the green weight of the total plant, stem and ribbon and the percentage green weight of leaves, shive, and leaves + shive of kenaf plants at 75, 100, 125 and 150 days old, from sowings on 15 June, 15 July, or 15 August. In the case of trial (a), plants 125 days old, from sowings made on 15 and 30 June, 15 and 30 July and 15 August, had fibre contents of 6·36, 6·64, 5·46, 4·74, and 4·21%, respectively. In trial (b), sowing rates of 10, 20 and 70 lb. per ac. resulted in fibre yields of 1866, 2343 and 2820 lb. per ac., respectively. In this trial, the plants were sown on 20 April and harvested when 118 days old.—P.J.B.

603 PATE, J. B. and others. **Varietal studies of kenaf, *Hibiscus cannabinus* L., in south Florida.** *Agron. J.* 1954, **46,** No. 2, 75-7, bibl. 14. [Everglades Agric. Exp. Sta., Belle Glade]

Data are given of the yield and fibre quality of 4 kenaf varieties grown at 2 locations in 1951. Varieties used were : A, E, I (Tingo Maria) and J (Commercial standard), originating from Java, Java, Peru and El Salvador, respectively. Dry-fibre yields were 1317, 1260, 1765 and 2514 lb. per, ac., and fibre contents 3·91, 4·44, 5·06 and 5·79%, respectively. Variety J had the greatest mean height, green yield and stalk yield. Fibre yields did not vary significantly among varieties grown at the two locations, one on Immokalee fine sand and the other on Everglades peat. Soil differences were minimized by heavy N treatments made to the fine sandy soil. Fibre percentages and yields as obtained by decortication or retting did not differ significantly, indicating that either method of extraction could

be used in experimental studies. The quality of decorticated fibre was better than that of retted fibre on peat soils ; on the fine sandy soil, the opposite was the case.—P.J.B.

604 TAMARGO, M. A. and JONES, M. D. **Natural cross-fertilization in kenaf.** *Agron. J.* 1954, **46,** No. 10, 456-9, bibl. 6, illus. [Com. Co-op. Fibr., Cuba]

605 JONES, M. D. and TAMARGO, M. A. **Agents concerned with natural crossing of kenaf [*Hibiscus cannabinus*] in Cuba.** *Agron. J.* 1954, **46,** No. 10, 459-62, bibl. 6. [Com. Co-op. Fibr., Cuba]

OIL CROPS

SESAME

606 MAZZANI, B. Morada : nueva variedad de ajonjoli producida en el Instituto Nacional de Agricultura. [**Morada, a new variety of sesamum bred at the National Institute of Agriculture.**] *Agron. trop., Maracay* 1953, **3,** No. 3, 205-9, illus. [Inst. Nac. Agric., Maracay, Venezuela]

The results of a test with a new variety of *Sesamum indicum* are announced. The variety is of medium height (40-70 cm.), resistant to lodging, and suitable for mechanical harvesting. In varietal trials it out-yielded all other varieties, yielding 1229 kg. seed per ha. compared with 1021 kg. per ha. yielded by the next best variety.—W.J.B.

LINSEED

607 DE FINA, A. L. and CASTELLS, R. Quince años de cultivos repetidos de linos oleaginos. [**Fifteen years of repeated sowings with linseed.**] *Rev. Fac. Agron., Eva Peron* 1954, **30,** No. 1a, 1-50, bibl. 7, illus., English summary p. 49. [Univ. Nac., Eva Peron, Argentina]

The 1938-49 experiment with repeated croppings of linseed on the same land, [described in *Fld Crop Abstr.* 6 : 727], was continued for a further 3 years. The land was alternatively sown with linseed for 3 years and rested for 3 years. Thus over the 15-year period there were three 3-year periods of continuous cropping, with periods of rest between. The average yields of seed from 7 varieties for the first, second and third periods of continuous cropping, respectively, were 1078, 721 and 390 kg. per ha. The average yields for the first, second and third year (within the periods), respectively, was 985, 860 and 345 kg. per ha. Thus over each period of continuous cropping there was a progressive fall in yields and the yields obtained in each 3-year period were lower than in the preceding one. Marchitamiento (wilt caused by *Fusarium lini*) had no important effect on yields. The highest yields of seed over the whole period were given by Población Faculdad (812 kg. per ha.), P.330 M.A. (812 kg. per ha.) and Buck 114 (807 kg. per ha.). Continuous cropping for 3 years and the repetition of these 3-year periods both caused significant decreases in 1000-seed weight. The average 1000-seed weight for the first, second and third periods, respectively, was 7.03, 6·41 and 6·3 g. Continuous cropping also caused significant decreases in the oil content of the seeds and in the iodine index of the linseed oil. —W.J.B.

608 BLACKMAN, G. E. and BUNTING, E. S. **Studies in oil-seed crops. 2. An assessment of the interrelationships between plant development and seed production in linseed [*Linum usitatissimum*].** *J. agric. Sci.* 1954, **45,** Pt. 1, 3-9, bibl. 10. [Dep. Agric., Univ. Oxford]

[See *Fld Crop Abstr.* 5 : 907.] Records of plant development in 25 multifactorial experiments were collected to analyse the effects of nutrient level, density, spatial arrangement and variety on seed production in linseed. By sampling techniques, estimates were made of plant density, extent of basal branching, the number of capsules per stem, the number of seeds per capsule and the seed weight. The expected plot yields, calculated from these data, agreed well with the harvested yields. On the addition of N, P and K, only a change in N level increased the seed-yield, and this was largely determined by an increase in the production of capsules. There was no alteration in either the number of seeds per capsule or the seed weight. Over a range of density of 30-80 plants per sq. ft., the number of capsules produced per plant was inversely correlated with the density. When the distance between drills was kept at 6-7 in., and the density varied by changing the seed rate, capsule production and seed yield, on an area basis, were rarely affected. When the seed rate was kept constant and the distance between drills was varied, then with a narrow width of drill (4 in.) the increase in plant density more than offset the fall in capsules per plant. There was evidence that at densities over 80 plants per sq. ft. the number of capsules per plant was reduced further and the number of seeds per capsule was also depressed. Varieties were characterized by differences in seed size, the number of seeds per capsule, capsules per plant and their ability to produce more capsules at high N levels. The superior yielding capacity of Royal could be ascribed to its high rate of capsule production.—From authors' summary.

RAPE

609 WAGNER, M. Der Einfluss der Erntezeit auf Ertrag und Kornqualitat von Raps. [**The influence of time of harvesting on yield and quality of rape seed**]. *Z. Pflbau* 1954, **5,** No. 3 111-15, bibl. 4. [Inst. Acker- u. Pflbau, Techn. Hochsch. München-Weihenstephan]

The experiments were conducted to determine the best stage at which to harvest rape, taking into account (1) the loss of seed from the bursting of fully ripe pods (particularly during changeable weather) and (2) the loss in quality (and economic value) if seeds are not chemically mature. The harvesting problem is caused by the slow rate of translocation of materials from other parts of the plant and their slow elaboration into proteins, oils and fats, a process which is only completed when the pod-bursting stage is reached. Seed of Lembke's winter rape (*Brassica napus* var. *oleifera* subvar. *biennis*) was harvested at seven 3- to 4-day intervals between mid-June and mid-July. From the table giving yield characteristics of seed harvested at these 7 dates, it is clear that the best stage for harvesting is when the seed is brown. In Bavaria this was 9 July.—D.B.

610 WAGENINGEN. Rijksinstituut Rassenonderzoek Landbouwgewassen. Bericht over rassenkeuze No. 169. Winterkoolzaad, 1954. [**Choice of varieties. Pamphlet No. 169. Winter oil-seed rape 1954.**] *Suppl. 17. LandbVoorl.* 1954, **11,** No. 8.

The variety Lembke's occupied 85% of the area in the Netherlands sown with winter oil-seed rape in 1953. In inter-provincial trials the variety Matador (which was tested on sea-clay only) yielded less seed than the 3 varieties Lembke's, Mansholt's Hamburger and Dippe's. Brief notes are given on the performance on different types of soil of each of the 4 varieties.—W.J.B.

611 BLÜMKE. Spätgesater Lihoraps als Gründüngung. [**Late-sown summer rape, variety Liho, as green manure.**] *Dtsch. landw. Pr.* 1954, **77,** No. 17, 240, illus. [Northeim]

Recommendations are made for sowing summer rape, variety Liho, as green manure. It maintains the soil at a high level of fertility and in good structure. Sowing before and up to 1 September should be at the rate of 12 kg. per ha., with weekly increments of 1 kg. until a maximum of 16 kg. per ha. is reached by the end of September. The seed should be broadcast. Either liquid manure with additional phosphate can be applied [quantities not stated], or 400 kg. NPK per ha.—M.P.

612 RIEPMA KZN, P. De toepassing van chemische onkruidbestrijdingsmiddelen in koolzaad. [**Application of chemical weed control to rape crops.**] *Reprint 172. Cent. Inst. agric. Res., Wageningen* [from] *LandbVoorl.* **10,** No. 11, 437-8.

The effect of calcium cyanamide and TCA on yields of winter oil-seed rape was determined in preliminary experiments in which calcium cyanamide was applied at 300 and 500 kg. per ha. (in February and March) and TCA at 10 and 20 kg. per ha. (in October and February) to rape crops which were almost weed-free. All treatments were compared with controls (no herbicides). In an experiment with calcium cyanamide in which no basal N dressing was given yields of rape seed were slightly reduced by the applications of herbicide compared with the control. March applications depressed yields less than February applications. In a further experiment, in which a basal dressing of 120 kg. N per ha. was given to treated plots and controls, calcium cyanamide at both rates gave slight increases in seed yields over the controls. It is recommended that calcium cyanamide should be applied to rape crops only when considerable quantities of chickweed are present and that normal dressings of N should be given in addition to the herbicide. Applications of TCA had no significant effect on seed yields compared with the control. TCA is known to give control of *Alopecurus myosuroides* when applied at the rate of 10-20 kg. per ha.—W.J.B.

613 RADET, E. La fumure du colza. [**The manuring of rape.**] *Potasse* 1954, **28,** No. 217, 129-31, illus. [Sta. Agron. de la Marne, France]

After a brief résumé of the cultivation of [winter] rape (*Brassica napus* var. *oleifera* [subvar. *biennis*]), its fertilizer requirements are dealt with in more detail. Recommended quantities of fertilizer and time of application are tabulated for rape when grown, (a) at the beginning of a rotation, (b) after cereals and (c) after legumes.—D.B.

614 WALKER, T. W. and others. **Some effects of sulphur and phosphorus on the yield and composition of rape** (*Brassica napus*). *N.Z. J. Sci. Technol. Ser. A* 1954, **36,** No. 2, 103-10, bibl. 16, illus. [Canterbury Agric. Coll., Lincoln]

Evidence is accumulating that sulphur deficiency may be important in some New Zealand soils. This paper presents a little more evidence that the gypsum contained in superphosphate may be of value in New Zealand agriculture, as in one trial rape responded significantly to gypsum in the presence of mono-calcium phosphate. Chemical analysis of the rape and soils showed some interesting nutrient interactions and relationships.—Authors' summary.

POPPY

515 NETHERLANDS. Rijksinstituut voor Rassenonderzoek van Landbouwgewassen. Bericht over rassenkeuze No. 181. Blauwmaanzaad 1955. [**Choice of varieties. Pamphlet No. 181. Poppy 1955.**] *Suppl. 2. LandbVoorl.* 1955, **12,** No. 1, 1-2.

Poppy [*Papaver somniferum*] occupied an area of 700 ha. in the Netherlands in 1954. The results are given of comparative trials carried out with the poppy varieties Emmabloem, Nobel, Noordster and Eckendorfer in the south-western sea-clay region and the central sea-clay region of the Netherlands in 1954. The new variety Eckendorfer, which was tried in the former region only, gave the highest yield of seed. The varieties Nobel and Emmabloem gave better quality seed than the other varieties.—W.J.B.

GENERAL

616 HILDITCH, T. P. La formation des acides gras dans les graines oléagineuses. [**The formation of fatty-acids in oil seeds.**] *Oléagineux* 1955, **10,** No. 2, 83-8, bibl. 21. [Liverpool, England]

Recent investigations into the formation of fatty-acids during the maturation of oil seeds are examined. Results from these investigations prove that saturated and unsaturated acids are formed during maturation by entirely independent mechanisms.—E.B.O.

LAND USE, SURVEYS AND MANAGEMENT

617 KERR, D. H. **Machair land in the Outer Isles.** *Scot. Agric.* 1954, **34,** No. 3, 157-61. [N. Scot. Agric. Coll.]

Machair is the term given to the flat, low-lying calcareous-sand soils fringing the western seaboard of the southern isles of the Outer Hebrides. Machair land runs for up to a mile inland in places and is characterized by a high lime status (pH 7·2-8), low humus content, a heavy weed population, susceptibility to wind erosion and drought. Observations are made on methods of cropping such land. Of oat varieties used on untreated land, only *Avena strigosa* and S171 (selection from *A. strigosa* × *A. brevis*) have shown sufficient resistance to grey speck disease to give satisfactory yields. Other varieties of oats have been grown successfully following soil treatment. Treatments thought to be best include applications of 30 lb. $MnSO_4$ + 20 lb. $CuSO_4$ as a dust when the crop is in the 4-leaf stage. Notes are given on the cultivation of potatoes and the use of seaweed as a manure on these soils.—P.J.B.

618 DEPARDON, L. and BURON, P. Contribution à l'étude agronomique de la Beauce du Loiret. [**A contribution to agronomic studies of the Beauce du Loiret.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1954, **5,** No. 3, 361-9, bibl. 5, illus. [Sta. Agron. de Blois, Loir et Cher, France]

An account is given of the relief, climate, geology, soil analyses and crops of this vast plain. Because the underlying calcareous rock is relatively near the surface, the land is unsuitable for "natural" grassland, but is suited to arable crops, viz., cereals (particularly wheat), lucerne, sainfoin, and root crops (particularly sugar-, industrial- and fodder-beet). The root crops can be cultivated where the surface layers of clay are relatively deep (up to 1·5 m.), as in the north of the area. A 3-course rotation is practised, namely, beet, cereal, lucerne. The fertilizers, together with their rates of application, which are applied to root crops, winter wheat, and spring oats or barley are tabulated.—D.B.

619† KLAPP, E. Der Acker- und Pflanzenbau Nordrhein-Westfalen. [**Agriculture and crop cultivation in the North-Rhine Westphalia region.**] *Z. PflErnähr. Dung.* 1954, **67,** No. 2, 116-23. [Inst. Boden- und Pflanzenbaulehre, Univ. Bonn/Rhein]

A general survey is given of the types of agriculture found in this region.—D.B.

620† ODEVING, B. Samhällsplanering av nytt land i Holland. [**The physical planning of new land in the Netherlands.**] *Svensk geogr. Årsb.* 1954, **30,** 7-23, bibl. 13, illus., English summary p. 22.

An account is given of the regional planning of the Zuiderzee polders for agricultural use.—P.J.B.

621 BERG, C. van den, and WESTERHOF, J. J. **Examination of soils and crops after the inundations of 1 February 1953. 1. Salty soils and agricultural crops.** *Neth. J. agric. Sci.* 1954, **2,** No. 4, 242-53, bibl. 5, illus.

Following the sea-water floods in the Netherlands in February 1953, trials were carried out to determine the effect on various flooded crops of the length of the period of inundation and the concentration of salt in the soil moisture (measured after the floods had subsided in April 1953). The concentration of salt in the soil moisture was expressed as a C-value (number of grams of NaCl per litre of soil moisture), measured in the 5-20 cm.

layer of soil. Other trials were carried out to determine the effect of the level of the C-value measured in March 1953 on the subsequent growth of spring-sown crops. The duration of flooding, over periods of 1-50 days (with flood water giving post-flood C-values of 0·5-17), had little effect on the subsequent growth of inundated winter wheat, winter rye and winter barley, but the C-value of the soil had a marked effect. Inundation of winter rye and winter wheat with water giving C-values of 7 or more had an adverse effect on the growth of both crops, more marked in the case of rye than of wheat. The effect of the C-value at the time of sowing on the yield of spring barley was intermediate between that previously recorded in a favourable (wet) growing season, 1946, and an unfavourable (dry) growing season, 1947. [See report by C. van den Berg in *Versl. Landbouwk. Onderz.* 1950, 56, No. 16.] The opinion given in the 1950 report, that spring barley cannot be sown at C-values above 10 with expectation of a reasonable (75% normal) yield, was confirmed. The variety Balder was more resistant to salt than Kenia and Saxonia. Kenia barley was sown at intervals from 8 March to 10 May ; the effect of the presence of salt in the soil (represented by the C-value measured in March) was progressively adverse with increasingly late sowing. Similar trials with spring oats, sugar-beet, potatoes, flax and peas generally confirmed the results given in the 1950 report on the sensitivity of various crops to the C-value of the soil moisture. The spring-sown crops mentioned above are all less tolerant of salt than spring barley and are arranged in descending order of salt-tolerance. The results of the 1953 trials differed from those of earlier ones in that flax appeared to be less tolerant than previously, probably because of the dry spring in 1953. In 1953, flax did not give 75% normal yield when sown at C-values higher than 2·5. Potatoes, on the other hand, were more salt-tolerant in 1953 than in the earlier trials and gave 75% normal yields when sown in soils with C-values as high as 6. The average C-value of the flooded soils fell rapidly during 1953-4. C-values on very salty soils were 19·5 in March, 1953, 11·8 at the end of the following September and 3·1 by mid-February, 1954. Comparable figures for slightly salty soils were 7·3, 3·4 and 0·7. The rapid decline in salt concentration in the soil moisture during winter 1953-4 is attributed to the application of gypsum in the period September to November, 1953.—W.J.B.

622† KILLIAN, C. La végétation autour du Chott Hodna, indicatrice des possibilités culturales et son milieu edaphique. [**The vegetation around the Chott Hodna, indicator of cultural possibilities and its edaphic environment.**] *Ann. Inst. agric. Algér.* 1953, **7,** No. 5, 1-80, bibl. 31, illus., map.

A study of the influence of soil on vegetation, and of vegetation as an indicator of the possible agricultural use of that soil, was made in the Chott Hodna, covering 8000 sq. km. in Algeria. This is a closed basin which collects the salt water from several wadis originating from the Atlas Mountains. The annual rainfall ranges from 300-400 mm. in the periphery to 180-200 mm. in the central basin. A part of this region is irrigated. A description is given of the different plant associations present, adapted to rocks, steppes, dunes and salt soils. The influence of flood water, and of wind, on vegetation are particular aspects studied. The general conclusion is that in an arid climate the distribution of wild plants is related closely to soil type. The presence of *Atriplex halimus* and *Salsola vermiculata* indicates a soil where there are possibilities of growing crops. The presence of *Salsola tetranda*, a halophyte, and of *Halocnemum strobilaceum* excludes that possibility. *Haloxylon schmidtii* is an indicator of the duration of flooding.—E.B.O.

623 CARIBBEAN ECONOMIC REVIEW. **The agricultural and forestry bases of industrial development in the Caribbean.** *Caribb. econ. Rev.* 1953, **5,** No. 1 and 2, 20-58. [Received October, 1954]

In the area covered by the Caribbean Commission, 2·5 million ac. are under cultivation and about 1·25 million ac. are in pasture. The cotton mainly grown is of the Sea Island type for export, the chief producers being the Leeward Islands (50%), Puerto Rico (40%) and St. Vincent (10%), comprising an area of 18,000 ac. In the Grenadines the Marie Galante variety is grown. Cotton-seed oil is refined and used for human consumption, while cotton-seed meal is used to a limited extent as animal fodder. The acreage devoted to rice is approximately 194,000 ac., mainly in British Guiana (50%), Surinam (25%) and Puerto Rico (10%). Mechanical cultivation of rice is practised. Rice is also imported for processing. Jamaica is the most important maize-producing country in this area. Maize meal is prepared for human food and animal fodder. Fully tabulated details are given of the acreage under pulses and root-crops. Pigeon peas [*Cajanus indicus*] and a carotene-rich, yellow variety of sweet potato are grown in Puerto Rico for canning. Cassava is grown for starch and for its flour which is used to replace wheat flour, in part. The possibilities of expansion and improvements in the field of agriculture are discussed.—M.P.

624† ERVIN, R. E. **Land use in southern Middle Chile.** *Diss. Abstr.* 1954, **14,** No. 11, 2036. [Univ. Florida]

A summary is given of the results of a survey in the Valdivia, Osorno and Llanquihue Provinces of southern Middle Chile.—P.J.B.

625† DRACHOUSSOFF, V. L'évolution de l'agricul-

ture indigène dans la zone de Léopoldville. [**The evolution of native agriculture in the Leopoldville region (Belgian Congo).**] *Bull. agric. Congo belge* 1954, **45,** No. 5 and 6, 1125-220 and 1525-617, illus.

626 Dean, J. H. **A land use study in the Uganda Protectorate.** *Diss. Abstr.* 1954, **14,** No. 11, 2035. [Clark Univ.]

An abstract is given of the results of a land-use survey of an area of 5500 ac. in the northern part of the elephant grass region of Uganda.—P.J.B.

627 Grantham, D. R. and Pilson, R. D. **Plant ecology as an aid to colonial development.** *Colon. Pl. Anim. Prod.* 1954, **4,** No. 2, 110-36, bibl. 4, illus.

A method of assessing the agricultural possibilities of an undeveloped region by means of a combined ecological and soil survey is described with reference to an actual survey of an area of 1290 sq. miles in the Nachingwea district of Tanganyika made on behalf of the Overseas Food Corporation. The survey was made by collating the results of traverses made on foot with photographs from an aerial survey. In general there was a close correlation between the location of the 10 main vegetation communities (which are described) with the main soil types.—W.J.B.

628† Agronomie Tropicale. La Collectivité Rurale Autochtone Modernisée [CRAM] d'Andilamena. [**The Modernized Native Rural Community of Andilamena.**] *Agron. trop., Nogent* 1954, **9,** No. 6, 687-719, illus., English and Spanish summaries p. 719.

This article consists of studies by different authors on the CRAM of Andilamena, one of the CRAM of Madagascar. The CRAM of Andilamena was founded with a view to improving the drained marshy land of this region, which will be irrigated. These studies, made on one of the 6 units into which this CRAM will be divided, are concerned with climate, soil, vegetation, agricultural possibilities of this region, trials at Lake Alaotra Agronomic Station, cattle rearing, etc. It is intended to grow rice in rotation with meadows, and annual crops (not irrigated), and to improve pastures.—E.B.O.

629 Dias, G. R. W. **A brief survey of mechanized agriculture in Ceylon.** *Trop. Agriculturist* 1954, **110,** No. 1, 5-8.

Mechanization of agricultural operations in Ceylon has taken place chiefly in the Dry Zone, where rainfall is 37-65 in. p.a. Most of the crops in this zone, which include maize, sorghum, cotton, groundnuts and upland rice, are grown in the season October-March. Mechanized preparation of the land for sowing takes place before the onset, in October, of the monsoon rains, which make tractor cultivation difficult. For ploughing under dry conditions the disc plough is found more suitable than the mould-board plough. Mechanized ploughing and cultivation is also carried out in some irrigated rice-growing areas ; in these areas, owing to the presence of irrigation bunds, tractor-mounted implements are preferred to trailed implements. In many cases, mechanized operations on privately-owned farms are carried out by State Tractor Units. Costing of the operations carried out by these Units has shown that tractor-cultivation in Ceylon, when properly managed, is profitable.—W.J.B.

630 Grindrod, J. **Hi-Ball land clearing in Western Australia.** *World Crops* 1954, **6,** No. 10, 420-1, illus.

A method of clearing scrub and forest in land reclamation is described. A Hi-Ball (a metal ball weighing 5-6 tons drawn by two tractors by means of 2 heavy chains each 240 ft. long) is capable of felling timber up to 15 in. in diameter. It was first used in the USA. Successful trials with Hi-Ball clearing in Western Australia are described. Areas of 70-140 ac. per day were cleared by each Hi-Ball unit.—W.J.B.

631† Eijsvoogel, W. F. De mogelijkheden op Nieuw-Guinea voor landbouwbedrijven op mechanische basis. [**Possibilities of farm mechanization in New Guinea.**] *Landbouwk. Tijdschr., Wageningen, Nieuw-Guinea Nummer* 1954, December, 39-48, illus., English summary pp. 47-8.

Climate, drainage and possible crops are described.—W.J.B.

FARMING SYSTEMS AND PRACTICES

632 WARNE, L. G. G. **Arable farming with eight inches of rain.** *Ass. Agric. Rev.* 1954, No. 25, 13-19, illus. [Univ. Karachi]

The main type of " dry crop " farming practised by the peasants near Karachi involves scarifying and embanking relatively flat areas of desert, or semi-desert, land. The area is then ploughed. Sowing is usually done in rows along the furrows. The embankment on 2 or 3 sides enables water to collect in the field, sometimes to a depth of 4-5 ft. after the summer rains. The main crops grown are : *Sorghum vulgare* (jowar, great millet), *Pennisetum typhoideum* (bajri, bulrush millet), mung (*Phaseolus radiatus*) and guar (*Cyamopsis psoralioides*). Other crops grown are : wheat, castor oil, pumpkins and *Phaseolus* spp. Jowar-straw yields, when good, average 30 cwt. per ac., whereas the natural herbage of *Cressa cretica* may yield only 1-4 cwt. per ac. No crop rotation is practised, but the wetter parts of the fields are kept for jowar. The rainfall averages only 8 in. p.a. and falls in winter and summer. Every foot of water collected above ground, by means of the embankments, percolates into the soil and may moisten it to field capacity to a depth of up to 3 ft. If sufficient water collects, contact with the ground water may ultimately be established. This system of agriculture continues to persist and affords a reasonable standard of living to the peasants.—M.P.

633 NOYEN, J. Effets de la protection des jachères sur les rendements des cultures en paysannat indigène. [**Effects on crop yields of protecting fallows on native farms.**] *Bull. Inform. INÉAC* 1954, **3,** No. 6, 333-6.

Trials were started at Gandajika, Belgian Congo, in 1936 to study the effect on the yield of various crops grown in rotation of : leaving the soil fallow for several years under a natural growth of *Imperata cylindrica,* or sowing it with various grasses; growing a second rotation of crops not preceded by fallow ; applying fertilizers. Partial results only are given from these trials. Bush fires burnt the fallows 2-3 times per year during the first years of the trials. After fire-belts had been established to protect the land, fires occurred on the fallows 3 times only during 8 years. On the fallows thus protected, the grasses, mainly *I. cylindrica,* formed a thick layer of vegetable matter which protected the soil and preserved the humus. The crop yields obtained after a protected fallow, without the application of fertilizers, exceeded those normally obtained by the natives as follows : cotton 77·5-132·5% ; maize 100-134% ; groundnuts 100% ; cassava about 100%. The application of fertilizers increased yields further.—E.B.O.

634† SERPETTE, R. La vocation agricole et l'exploitation du périmètre irrigué des Doukkala. [**The agricultural utilization of the irrigated area of the Doukkala.**] *Terre maroc.* 1954, **28,** No. 299, 355-6.

The best use of irrigation water in the Doukkala region, Morocco, has been studied for the last 3 years. The yields of local crops (winter cereals, maize, beans, etc.) grown under irrigation are 2 to 4 times greater than the average yields without irrigation. These crops, and also lucerne, peas, cotton and groundnuts, give profitable returns under irrigation.—E.B.O.

635† KOLPAKOV, V. V. [**Basic principles for computing the irrigation regime for crops in the southern Ukraine and northern Crimea.**] [Russian] *Izv. Timirjazevsk. seljshoz. Akad.* (*Bull. Timirjazev Agric. Acad.*) 1954, No. 2(6), 95-128, bibl. 9, illus.

636 COOKE, G. W. **Recent advances in fertilizer placement. 2. Fertilizer placement in England.** *J. Sci. Fd Agric.* 1954, **5,** No. 9, 429-40, bibl. 14, illus. [Chem. Dep. Rothamst. Exp. Sta.]

Phosphorus and potassium fertilizers used for cereals should be drilled with the seed ; half-dressings applied in this way have produced as much grain as full-dressings broadcast. Where potatoes are hand-planted in furrows, fertilizer may be concentrated near the seed satisfactorily by broadcasting it over the furrows before planting. When a mechanical potato planter was used on flat land, fertilizer dressings applied in bands beside the seed produced higher yields and more profit than broadcast dressings. Fertilizer placed near the seed produced higher yields of beans and peas than the same quantities of broadcast fertilizer. For high-value cash crops, placement may be very profitable. Absence of crop responses in field experiments may be due to fertilizers having been applied in the wrong place. Some crops, e.g. sugar-beet, mangels and kale, made better early growth when complete NPK fertilizer was placed beside the seed than when fertilizer was broadcast, but at harvest the two methods of application gave similar yields. Fertilizers broadcast and incorporated deeply with the soil have advantages over dressings worked-in shallowly in dry seasons and for deep-rooting crops. Root growth of most crops was stimulated by dressings of mixed fertilizers placed near the seed. N, P and K fertilizers placed near the seed of peas each stimulated extra root growth. The factors that affect the value of fertilizer dressings are discussed, with particular reference to the kinds of root systems developed by crops. —From author's summary.

SOIL AND WATER CONSERVATION

637† ČIRVINSKIĬ, I. A. [**Summer sowing of *Sinapis* spp. as strip crops.**] [Russian] *Dost. Nauki Pered. Opyta Seljshoz.* (*Achiev. Sci. Adv. exp. Agric.*) 1954, No. 6, 87-9, illus.

The experience of the Ukrainian Scientific Research Institute for Agriculture and of the State Commission for Varietal Trials in the Pavlodar Province, Kazah SSR, has shown that the most practicable means for conserving snow on collective farms is by sowing *Sinapis* spp. in strips. The tests have included sowings of sunflower, maize, sorghum, millet, lupin, *Camelina* spp., and others, of which the best appeared to be either white mustard or *Camelina* spp. *Sinapis alba* is sown (across the rows of the winter grain crop and at right angles to the prevailing wind) at a rate of 1 or 1·5 kg./ha., with 1·5 m. between the strips. In the steppe zone of Siberia and Kazah SSR, the best strip crop is *Sinapis juncea*. When sown on fallow 2 months before the sowing of winter grain, the strip crop attains a height of 100 to 125 cm. before the onset of hard frosts. In each linear metre there should be not more than 8 or 10 plants of *S. juncea*, and width between rows should not exceed 7 or 8 m.—M.H.

WEEDS AND WEED CONTROL

638 WIESE, A. F. and DUNHAM, R. S. **Fall applications of IPC and CIPC for killing wild oats (*Avena fatua*) prior to sowing oats.** *Agron. J.* 1954, **46,** No. 8, 358-60, bibl. 7, illus. [Agron. Dep., Univ. Minnesota, St. Paul]

In view of previous reports that 2,4-D was able to kill dormant seeds permeable to water, studies were made of the possibility of killing wild-oat seed in soil by applications of IPC and CIPC in the autumn, without harming subsequent spring-sown crops. Two field trials were carried out. In the first, on Waukegan silt loam, wild oats were sown in spring, and applications of nil, 5, 10 and 15 lb. IPC and CIPC per ac. were made on 21 August, and 1 or 28 September. Spray volume was 40 gal. and sprayed plots were disced 3 times after treatment. On 1 May after discing, Mindo oats were sown. In the second trial on Fargo silty clay-loam, applications of nil, 5, 10 and 15 lb. IPC and CIPC per ac. were made on 6 October by methods similar to those of the previous trial. In spring, linseed, barley and maize were sown. Soil samples from different depths were taken from plots treated with 15 lb. CIPC per ac. In the first trial, all rates of herbicidal treatment at all dates significantly reduced wild-oat stands, though only rates of 10 and 15 lb. IPC applied in September gave complete control. These treatments almost eliminated the spring-sown oats, however. Applications of 5 lb. CIPC in August, or early September, did not significantly reduce subsequent cultivated-oat stands, but reduced wild-oat stands by over 48%. In the second trial, the herbicidal treatments were ineffective for controlling wild oats. Applications of 5 lb. CIPC per ac. adversely affected linseed, maize and, in particular, barley stands. The 15 lb. IPC treatment markedly reduced the number of wild-oat seeds present in the soil. Laboratory studies were also made to determine whether the effect of CIPC on wild-oat seed was to break its dormancy or to reduce its viability. The seed was soaked for periods ranging from 1 to 32 hr. in concentrations of 0·4 or 2 ppm. CIPC, or in water. CIPC did not break dormancy; long periods of soaking in CIPC solutions or water induced secondary dormancy. Dormant seed was killed by 2 ppm. concentrations of CIPC; 0·4 ppm. concentrations killed non-dormant seed, only.—P.J.B.

639† MEADLY, G. R. W. **Weeds of Western Australia—Mexican poppy.** *J. Dep. Agric. W. Aust.* 1954, **3,** No. 4, 401-3, illus.

The annual weed, *Argemone mexicana*, is described. It has a toxic principal which is noxious to livestock. It can be controlled to some extent by cultivation or mowing, but spraying the young plants with a herbicide is more effective. When growing in a pasture, 1·5 lb. acid equivalent of the 2,4-D ester per ac. should be applied. When growing in a cereal crop, the weed can be controlled with 1 lb. acid equivalent of 2,4-D amine per ac.—M.P.

640† MEADLY, G. R. W. **Weeds of Western Australia. Water hyacinth (*Eichhornia crassipes*).** *J. Dep. Agric. W. Aust.* 1954, **3,** No. 5, 577-81, illus.

A description of water hyacinth (*Eichhornia crassipes*), a weed of irrigation channels and waterways, is given. Aerial, low-volume spraying of 6-8 lb. acid equivalent of the 2,4-D amine in 2 gal. water per ac. successfully eradicated the plant from Lake Monger. Spraying was carried out early in the summer, November and December.—M.P.

641 RIVERA, J. R. **Control of Buñga ñg tubo (*Aeginetia indica* L.) with chemical weed killers.** *Philipp. Agriculturist* 1953, **37,** No. 7, 407-21, bibl. 6, illus. [Philippine Cent. Agric. Exp. Sta., Laguna]

642 WILD, H. **Rhodesian witchweeds.** *Rhod. agric. J.* 1954, **51,** No. 5, 330-42, bibl. 9, illus.

The witchweeds occurring on crops of economic importance in Rhodesia are illustrated and methods of control discussed. *Striga asiatica* and *S. forbesii* are parasites of maize, *Alectra vogelii* is a parasite of cowpeas (*Vigna unguiculata*) and other cultivated legumes. *Striga gesnerioides* and *Alectra kirkii* parasitize tobacco. Other species of *Striga* and *Alectra* are briefly mentioned, but are not known to be of any economic importance in Rhodesia.—M.P.

643 CONNOLD, W. Q. and PRYTHERCH, E. I. **The use of sulphuric acid for controlling weeds in Brassica crops.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 10, illus. [NAAS Southwest. Prov., Crete Hill, Westbury-on-Trym, Nr. Bristol]

A review is given of experiences in Britain on the use of H_2SO_4 solutions for controlling weeds in Brassica crops, particularly kale. It was concluded that the use of H_2SO_4 sprays was limited in many areas by the lack of experience in their use and by the lack of proper equipment. At present, many crops are treated when they are partly canopied by weeds, under which conditions, the crop enjoys a considerable measure of protection from the sprays. The use of relatively more dilute H_2SO_4 solutions at a relatively earlier growth stage was considered desirable and would entail less drain in soil fertility and a more rapid recovery of the crop.—P.J.B.

644 NORTHERN IRELAND. Agricultural Research Institute. **Twenty-seventh Annual Report 1953-54.** *Rep. agric. Res. Inst. N. Ire.* 1954, pp. 38. [Hillsborough]

Weed control, pp. 21-2. The sodium salt of MCPA, when sprayed on cereals, effectively controlled, or destroyed, weeds such as redshank, spurrey, nettle and chickweed, when applied at the early stages of weed growth. Where cereal crops had been undersown with grasses and clovers, MCPA killed nearly all the clover seedlings. The herbicide was applied at the rate of 3-5 pints per ac., in 30 gal. of water.—M.P.

545 TEMPLEMAN, W. G. **The present position of herbicides in British agriculture.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 12. [I.C.I. Ltd., Jealott's Hill Res. Sta., Bracknell, Berks]

This paper is largely concerned with a discussion of those aspects of weed control about which there is an insufficiency of knowledge. Among topics noted are : the use of sub-lethal herbicidal rates to alter the balance of vigour between crop species and weeds, in favour of the crop ; the autumn spraying of cereals with herbicides ; the specific effect of DNC in raising cereal yields ; weed control in root crops, such as kale and sugar-beet. Observations are made on the possible herbicidal value of 2,4,6-tribromophenylnitramine and 2-chloro-9-fluorenol-9-carboxylic acid, which appear to act by deranging the normal phototropic and geotropic properties of seedlings, and of trichothecin which is capable of inhibiting the phytotoxic effects of 2,4-D and MCPA.—P.J.B.

646 WILLARD, C. J. **Weed control : past, present, prospects.** *Agron. J.* 1954, **46,** No. 11, 481-4. [Ohio Agric. Exp. Sta., Columbus]

This paper was delivered as the Presidential Address to the American Society of Agronomy and it reviews the expansion in the use of herbicides in the USA and current problems in their practical application.—P.J.B.

647 HENDERSON, J. H. M. and others. **Effect of 2,4-D on respiration and on destruction of IAA in oat and sunflower tissues.** *Science* 1954, **120,** No. 3122, 710-12, bibl. 9, illus. [Carver Found., Tuskegee Inst., Ala]

The results of experiments with oat and sunflower sections showed that in the case of oat coleoptile sections, increasing the concentration of 2,4-D, where the direct method of Warburg was used, resulted in a decreased rate of destruction of indole acetic acid (IAA) by the tissues, whereas in the case of sunflower hypocotyl sections, 2,4-D had no effect on, or increased the destruction of, IAA. From these results, it was concluded that there was a possible difference between mono- and di-cotyledonous plants in physiological reactions involving 2,4-D and IAA, via the IAA oxidase system, and that this may be the basis of the selectivity of certain growth-regulating herbicides, notably 2,4-D.—P.J.B.

648 CARPENTER, K. and others. **Techniques for the rapid evaluation of potential new herbicides.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 9, bibl. 5. [May and Baker Ltd., Hort. Res. Div., Ongar, Essex]

Data are given of the performance and reproducibility of results given by the following : (a) a laboratory sprayer for treating weeds and crops in pots and (b) a field sprayer for accurately treating small plots. A brief note is given on the characteristics of Ω-(4-chloro-2-methyl phenoxy) butyric acid, which appears to exercise a herbicidal power almost as high as that of MCPA, but with a much better selective discrimination in favour of clovers.—P.J.B.

649† LINSER, H. and FROHNER, W. Zur Prüfung der Wirksamkeit verschiedener Herbizide unter vergleichbaren Bedingungen. [**Testing the effectiveness of different herbicides under**

comparable conditions.] *Z. Acker- u. Pflbau* 1954, **98,** No. 3, 369-82, bibl. 12, illus. [Österreichische Stickstoffwerke A.G., Linz/Donau]

n order to overcome disturbances introduced into eld experiments by changes in weather, these xperiments were conducted under controlled con- itions in glasshouses. Plant species were tested for neir sensitivity to known herbicides, using the Na alt of 2,4-D as the standard of comparison. The ffectiveness of these substances was rated umerically on a scale with 2,4-D = 100. On this cale the herbicides were rated as follows : 2,4-D utylester, 122; 2,4,5-T Na, 93 ; 2,4,5-T butylester, 43 ; and 2,5-D Na, 63. The results of these plant ensitivity tests in the greenhouse did not agree ith those of Rademacher obtained in field experi- ients.—D.B.

650 George, D. K. and others. **Carbamate herbicides. Relative herbicidal and growth-modifying activity of several esters of N-(3-chlorophenyl)-carbamic acid.** *J. agric. fd Chem.* 1954, **2,** No. 19, 990-5, bibl. 4. [Res. Devel. Lab., U.S. Industr. Chem. Co., Div. Nat. Distillers Products Crop., Baltimore, Md]

he results are presented of screening tests of a nge of esters of N-(3-chlorophenyl)-carbamic cid, using a number of mono- and di-cotyledonous lants. Data are given of the properties of the hemicals tested, their activity against the different lant species used and their selectivity quotient.— .J.B.

651 Weintraub, R. L. and others. **Relation between molecular structure and physiological activity of plant growth regulators. 2. Formative activity of phenoxyacetic acids.** *J. agric. fd Chem.* 1954, **2,** No. 19, 996-9, bibl. 11. [Camp Detrick, Federick, Md]

)ata are given of the formative activity, using a ean leaf repression technique, of some 145 ring- ubstituted phenoxyacetic acids. The presence f a halogen atom at position 4, or at positions 4 and , on the ring, was associated with a high growth- egulating activity.—P.J.B.

652 Gard, L. N. and others. **Herbicide residues. Residues in crops receiving pre-emergence treatment with isopropyl N-(3-chlorophenyl) carbamate.** *J. agric. fd Chem.* 1954, **2,** No. 23, 1174-6, bibl. 6. [Columbia-Southern Chem. Corp., Barberton, Ohio]

)ata are given of the IPC contents of a number of rops, including sugar-beet roots and foliage, otton seed and groundnuts which had received pre- mergence treatments ranging from 2·5 to 8 lb. PC per ac. The IPC content of the crops at har- est was not over 0·05 ppm. The method of assay described.—P.J.B.

653 Frost, Carmel and Gathergood, Audrey, L. **Methods and results of small scale testing of MCPA derivatives.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp 7. [I.C.I. Ltd., Fernhurst Res. Sta., Berks, England]

A technique for screening herbicides, using mustard (*Sinapis alba*) and buckwheat (*Fagopyrum esculentum*) seedlings is described. The results are given of two experiments, the first of which was made to compare : (a) an aqueous solution of MCPA K salt, containing 4 lb. a.e. per gal., (b) MCPA K salt as an aqueous solution containing 4·4 lb. a.e. per gal. and (c) MCPA Na salt as an aqueous solution containing 2·6 lb. a.e. per gal. Where these materials were tested on mustard seedlings, they were very similar in efficiency. It appeared that such trials carried out in winter gave less reliable results than those carried out between May and October. In the second trial, the following 5 esters of MCPA were compared, using mustard as the test crop : the methyl, ethyl, iso-propyl, n-butyl and iso-butyl esters, formulated as water-miscible liquids. The n-butyl and iso-butyl esters appeared to be the most effective. There was evidence that the results of greenhouse screening trials, as described in this paper, were a valid and reliable indication of the comparative efficiency of herbicides.—P.J.B.

654 Sherburne, H. R. and Freed, V. H. **Soil effects on herbicides. Adsorption of 3 (*p*-chlorophenyl)-1, 1-dimethylurea as a function of soil constituents.** *J. agric. fd Chem.* 1954, **2,** No. 18, 937-9, bibl. 9, [Oregon Agric. Exp. Sta., Corvallis]

A study of the absorption of CMU by different soil types, and other absorbent materials, showed that organic matter had a very high capacity to absorb CMU and that there was a very highly significant positive correlation between the organic matter content of soils and their capacity to absorb CMU. There was also a significant positive correlation in the case of clay in soils. From these results, it was concluded that CMU would be less effective for given rates of applications on soils with a high organic matter content than on those with a low content ; also, that CMU would persist longer in heavy than in light soils and would be most effective under fairly moist, but not excessively wet, soil conditions.—P.J.B.

655† Fryer, J. D. and Elliott, J. G. **Spraying equipment for experimental work.** *Paper read at 2nd Brit. Weed Control Conf., Harrogate 1954* pp. 6, bibl. 2. [A.R.C. Unit Exp. Agron., Oxford]

A description is given of a pneumatic-type knapsack sprayer and two car-mounted sprayers, designed particularly for the application of herbicides to experimental plots.—P.J.B.

656 BUTLER, J. L. and others. **Lightweight sprayer for experimental plots.** *Agric. Engng, St. Joseph, Mich.* 1954, **35,** No. 12, 874, bibl. 5, illus.

A description is given of a herbicide sprayer, weighing 105 lb., suitable for experimental work. —P.J.B.

657† NEW ZEALAND. Weed Control Conference. **Proceedings of the Seventh Conference. Dunedin.** 1954, pp. 94.

The following papers were read : (1) Isomers of MCPA, by L. J. Matthews ; (2) Comparison of the polyethylene glycol esters of the phenoxyacetic acid derivatives, by P. S. Ferens ; (3) Quantitative methods of evaluating weedicides applied to pastures, by D. Edmond ; (4) Weed problems in Otago and Southland, by L. N. Marshall ; (5) Control of pasture weeds in relation to clover tolerance, by P. B. Lynch and F. C. Allen ; (6) Weed control in cereals, by J. N. Fitzgerald ; (7) Weed control in root crops, by J. J. A. McLaughlin ; (8) Chemical desiccants for potato harvesting, by F. C. Allen ; (9) Some further characteristics of low volume nozzles, by C. J. Crosbie ; (10) Ragwort control, by D. L. Bloxham ; (11) Symposium on total weed destruction, by F. B. Thompson and others ; (12) A marker system using titanium oxide, by G. H. Blair ; (13) Nassella tussock control, by R. A. Milne ; (14) Symposium on scrub control—sweet briar, by A. R. Dingwall ; scrub weeds of central Otago, by R. C. Schofield; mechanical control of manuka, by P. S. Waters; scrub control, by H. R. W. Skinner.—M.H.

CROP BOTANY

658† BAULE, B. Eine physikalische Analogie zum Pflanzenertragsgesetz. [**A physical analogy of the law of plant yield.**] *Z. Acker- u. Pflbau* 1954, **98,** No. 3, 265-78, illus. [Graz, Austria]

A physical analogy with the electric circuit has led the author to the same law of growth which he put forth earlier. This law is a compromise between the laws of Liebig and of Mitscherlich, and, as shown by several mathematically treated examples, it fits the facts better than either of the latter.—D.B.

659 BLACK, C. A. and KEMPTHORNE, O. **Willcox's agrobiology. 1. Theory of the nitrogen constant 318. 2. Application of the nitrogen constant 318.** *Agron. J.* 1954, **46,** No. 7, 303-10, bibl. 36.

In the first paper, the theoretical basis of Willcox's concept of the nitrogen constant 318 is critically examined and a number of fallacies are claimed to have been found and are expounded. It is held that Willcox provides no adequate theoretical basis upon which biological significance can be attributed to the value 318. In the second paper, experimental evidence is adduced to test the validity of Willcox's nitrogen constant 318, under the conditions of which, plants grown " normally " under optimum conditions in respect of all growth factors, including N, absorb 318 lb. N per ac. within each growth cycle. Data from experiments are given which are held to contradict this theory, since the data (from pot trials) are held to show that the observed N content of plants can exceed by a considerable margin the value of 318 lb. N per ac. ; also, it is shown that the extrapolated maximum N content of plants can exceed 318 lb. N per ac. within one growth cycle. Willcox's procedure for obtaining a " constant" for K, as in the case of N, is used and applied to data taken from experiments with sugar-cane. It is demonstrated that the maximum possible dry-matter yield, as calculated from the nitrogen constant, is 15·6 times as great as that found by using the K constant. It is held that Willcox's nitrogen constant 318 can be neither theoretically nor experimentally substantiated.—P.J.B.

660† WHITE, W. C. and BLACK, C. A. **Willcox's agrobiology. 3. The inverse yield-nitrogen law.** *Agron. J.* 1954, **46,** No. 7, 310-11, bibl. 15. [Iowa Agric. Exp. Sta., Ames]

Data from pot trials with maize and sorghum, in which the plants were grown to maturity in media containing different amounts of nitrogen, were used to test the validity of Willcox's inverse yield/nitrogen law. The data from these trials are considered to demonstrate the invalidity of Willcox's inverse yield/nitrogen law. The observed similarity in the total nitrogen content of crops growing under uniform environmental conditions is considered to be due to restriction of the amount of nitrogen taken up by the plants as a result of the limited supply of nitrogen in the soil. Where the limitations on nitrogen supplies are removed, inherent differences in the capacity of different crops to absorb nitrogen become apparent.—P.J.B.

661 WILLCOX, O. W. **Quantitative agrobiology : 1, The inverse yield-nitrogen law. 2. The nitrogen constant 318. 3. The Mitscherlich equation and its contents. 4. Apparent exceptions to the Mitscherlich law.** *Agron. J.* 1954, **46,** No. 7, 315-28, bibl. 9. [197 Union St., Ridgewood, N.J.]

In the first paper, the author sets out to demonstrate the validity of his inverse yield/nitrogen law, a definition of which is given. Data which were

previously adduced from pot trials with sorghum and maize and which were used to show the invalidity of the law [Abs. 660] are rearranged by the author to substantiate it. Other data are also adduced to show that the N content of crops varies inversely with their dry-matter content. In the second paper, a justification for the theoretical basis of Willcox's nitrogen constant 318 is given, based on the laws of mass action as applied to the relations between plants and the growth factors to which they are subjected, and also on the basis of the allometric law, which postulates a quantitative proportionality between the various component parts of a plant organism. In the third paper, the theory of the Mitscherlich equation and its constants for N, P_2O_5 and K_2O is reviewed and illustrated by data from potato, mangel and sugar-beet trials, conducted in Germany by Mitscherlich. The conformity between the law of diminishing increments is discussed. In the fourth paper, exceptions to the Mitscherlich equation and its constants are considered, with particular reference to the question of nutritional unbalance and the work of van der Paauw, who concluded that the constant effect factor of 0·6 given by Mitscherlich for P_2O_5 was not constant, but varied with the species of crop. The author concludes that no significant inroads upon the validity of Mitscherlich's equation and constants have been made by the objections raised in the papers reported in Abs. 659 and 660.—P.J.B.

662† MAKKINK, G. F. Het druppelen van planten. [**Guttation in plants.**] *LandbVoorl.* 1954, **11,** No. 8, 380-4, bibl. 5, illus. [Cent. Inst. Agric. Res., Wageningen]

Guttation in plants (grass and field crops) is discussed with special reference to the value of the phenomenon as an indication of the plant water-balance. In young growing plants, a reduction in the length of the guttation period per 24 hr. indicates a corresponding reduction in the period when the water supply to the plant exceeds transpiration. In grassland, young shoots capable of guttation can be found during the summer season, but, in fully grown arable crops, the phenomenon can be observed only in certain growing weeds (a list of which is given) since guttation does not take place in mature crop plants.—W.J.B.

663 ŠČERBAKOV, B. I. [**The dependence of changes in water-holding capacity of plant assimilating organs on fluctuation in transpiration**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **99,** No. 4, 637-40, bibl. 4. [Pl. Introduction and Desert Reclamation Inst., Acad. Sci., Kazah SSR]

The author's study with soft spring-wheat and certain species of the desert plants *Kochia, Artemisia* and *Ceratocarpus* was carried out in 1949-51 on unirrigated plots of the Iliĭsk Experimental Base of the above Institute, the plots being located in the southern Balhaš region on the northern spur of the Džungarsk Ala-Tau. Transpiration of the leaves of the experimental plants was recorded by the usual gravimetric method, and the water-holding capacity was determined by leaf impregnation (see Litvinov, *Bot. Ž.* 1942, 17, No. 5-6). The data are related to time of day, vegetative period of the plants, and soil moisture. While there is evidence (1) that an increase in transpiration intensity of the leaves at mid-day in all the experimental plants coincides with an increase in their water-holding capacity; (2) that in all plants a decrease in transpiration intensity towards the end of the vegetative period (observations made during the period 14 April to 20 June) coincides with a decrease in water-holding capacity; and (3) that in the wheat variety Erythrospermum 841 both transpiration and water-holding capacity are greater in the upper leaves than in the lower, there is, however, in the desert species when grown under different amounts of soil moisture, no such correlation between changes in transpiration and water-holding capacity. These desert plants transpire more actively under a plentiful supply of soil moisture, but at the same time their water-holding capacity is lessened. Further tests were made (6 replications) with different varieties of spring wheat (Erythrospermum 841 and Lutescens 797) grown in culture vessels with soil moisture of 30, 60 and 80% of full moisture-holding capacity. These results confirmed the data obtained from the above desert plants. The author concludes that when changes in energy of transpiration of the leaves coincide with increase or decrease in water-holding capacity (or with a lowering or raising of evaporation rate), such coincidence is fortuitous. This view does not support that of Novogrudskiĭ (*Herb. Abstr.* 17 : 1768) who claimed that there is a direct correlation between changes in transpiration rate and water-holding capacity of the leaves. The author suggests that the reason for the absence of this direct correlation is because changes in water-holding capacity are subsidiary to the total expenditure of the plants' metabolic substances while transpiration reacts primarily and automatically to conditions of the external medium.—M.H.

664 WAHBA, I. J. **The effect of varying minimum soil moisture level on growth and mineral absorption of some young horticultural crops.** *Diss. Abstr.* 1954, **14,** No. 11, 1878. [Univ. Missouri]

Young plants of gladiolus, onion, sweet-corn and kale were grown on soil and sand media in which maximum soil moisture levels of 75, 50, 25, and 0% of the readily available moisture range were provided by bringing the soil-moisture level back to field capacity as soon as it had reached the

prescribed maximum. The supply of Ca, Mg, K and P ranged from very low levels to saturation levels in the soil and sand media. Regardless of such factors as a reserve food supply in the case of gladiolus and onion, plant density in relation to the available nutrient supply and variations in the ratios of Ca, Mg, K and P, total plant growth was greatest at the highest soil-moisture level. This difference between plant growth at low and high soil-moisture levels was increased by reducing the supply of available nutrients, or increasing plant stands. Increases in the supply of plant nutrients was, to some extent, able to offset the adverse effects of reduced soil-moisture supply on plant growth.—P.J.B.

665† TIHOMIROV, B. A. and STRELKOVA, O. S. [**Mycorrhiza of plants in the Arctic zone.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **97,** No. 2, 337-9, bibl. 10. [Komarov Bot. Inst., Leningrad State Univ.]

Hitherto there has been little study of the laws of zonal distribution of mycorrhiza in the different types of plants in various associations. The authors began this investigation in 1949 with special reference to conditions in the Arctic region (low temperature of the soil, deficiency of soil nitrogen, etc.), in the western part of the Taimyr. The root systems of 92 species of vascular plants (21 families) were studied. No mycorrhiza were found in roots of plants belonging to the Leguminosae, Cyperaceae, Polygonaceae (and 5 other families), but mycorrhiza were found in roots of plants belonging to 13 families, which included the Gramineae. Endotrophic mycorrhiza occurred (as a homogeneous mass) in the roots of *Atropis angustata, Arctophila fulva, Arctagrostis latifolia, Festuca brevifolia, F. cryophila, Hierochloa alpina* and *H. paueiflora*. It is concluded that because the low temperature and poor aeration of the arctic soils make conditions unsuitable for the development of the mycelia, the fungi are partially parasitic on the grass roots.—M.H.

666 YOUNIS, A. F. **Experiments on the growth and geotropism of roots.** *J. exp. Bot.* 1954, **5,** No. 15, 357-72, bibl. 23, illus. [Dep. Bot., King's Coll., London]

667† POLLOCK, B. M. and others. **Studies on roots. 2. Effects of coumarin, scopoletin and other substances on growth.** *Amer. J. Bot.* 1954, **41,** No. 6, 521-9, bibl. 13, illus. [Connecticut College, New London]

A technique has been developed for culturing roots under conditions favourable to rapid growth which permit microscopic examination, accurate measurement of the growth, and the application of chemicals in known concentrations during the experiment. The effects of coumarin and of scopoletin upon the growth of roots of *Phleum pratense* and of *Avena sativa* are reported. Both of these substances inhibit root growth, but coumarin is about 50 times as effective as scopoletin. Coumarin appears to upset the polarity of growth, particularly in the region of cell elongation, but it does not eliminate meristematic activity or root hair development. Scopoletin seems to inhibit the whole growth process ; at higher concentrations the root acquires a greenish discoloration in the differentiating and maturer portions. The application of mixtures of coumarin and scopoletin did not result in significant additive inhibitions. The addition of BAL (2,3-dimercaptopropanol) did not relieve the inhibition of root growth by coumarin and scopoletin. Inhibitions caused by IAA were augmented by additions of scopoletin and of umbelliferone. There was little or no effect on root growth from applications of the fluorescent root-tip glycoside from *Avena* roots or of its aglycon. [See Abs. 404.]—Authors' summary.

668† FARKAS, G. L. Die toxische Wirkung einiger Zucker auf die Wurzeln der Pflanzen. Zuckerantagonismen. [**The toxic effect of some sugars on plant roots. Sugar antagonism.**] *Biol. Zbl.* 1954, **73,** No. 9/10, 506-21, bibl. 25, illus. [Agric. Res. Inst., Hungarian Acad. Sci., Martonvásár, Hungary]

The paper deals with the toxic action of galactose, a sugar which is widespread among plants and has been observed in (among other plants) *Avena sativa, Triticum vulgare, Hordeum vulgare, Zea mays, Oryza sativa, Brassica oleracea, Linum usitatissimum* and *Helianthus annuus*. The toxic action of galactose on plant roots is thought to be due to its stereochemical structure being similar to that of glucose. The final result of galactose poisoning is coagulation of the cytoplasm.—D.B.

669 MARTIN, D. C. **The absorption and translocation of radio-strontium by the leaves, fruits and roots of certain vegetable plants.** *Diss. Abstr.* 1954, **14,** No. 11, 1875. [Michigan State Coll.]

670† KAINDL, K. Untersuchung über die Aufnahme von P^{32} markiertem primärem Kaliumphosphat durch die Blattoberfläche. [**Investigation of the absorption of labelled P^{32} in primary potassium phosphate through the leaf surfaces.**] *Bodenkultur* 1953, **7,** No. 4, 324-53, bibl. 18, illus. [Received October, 1954]

The plants used for this detailed investigation were *Solanum nigrum, Galinsoga parviflora* and *Triticum sativum*.—M.P.

671 WEBSTER, G. C. **Incorporation of radioactive**

glutamic acid into the proteins of higher plants. *Pl. Physiol.* 1954, **29,** No. 4, 382-5, bibl. 12. [California Inst. Technol., Pasadena]

672† LANGSTON, R. and LEOPOLD, A. C. **The dark fixation of carbon dioxide as a factor in photoperiodism.** *Pl. Physiol.* 1954, **29,** No. 5, 436-40, bibl. 12, illus. [Agric. Exp. Sta., Lafayette, Indiana]

673 LATZKO, E. Einfluss von Cl- und SO_4-Ernährung auf die Enzymtätigkeit von Kulturpflanzen. [**The influence of nutrition with chloride and sulphate ions on the enzyme activity of crop plants.**] *Z. PflErnähr. Düng.* 1954, **66,** No. 2, 148-55, bibl. 25. [Techn. Hochschule, München-Weihenstephan, Bayern, Germany]

Experiments with potato (*Solanum tuberosum*) leaf and tuber], beans (*Phaseolus vulgaris*), sugar-beet (*Beta vulgaris* var. *rapa*) and summer barley (*Hordeum distichum nutans*) showed that sulphate manuring (as K_2SO_4) increased the activity of those enzymes which hydrolise carbohydrates, namely, saccharase, amylase and *B* glucosidase, while chloride manuring (as KCl) decreased the activity of these enzymes. Results are tabulated.—D.B.

674† BOGDAŠEVSKAJA, O. V. [**Physiological conditions of ricinine biosynthesis.**] [Russian] *Doklady Akad. Nauk SSSR* (*Proc. Acad. Sci. USSR*) 1954, **99,** No. 5, 853-4, bibl. 6. [Orehovo-Zuevskiĭ Pedagogic Inst.]

The mechanism and physiological conditions determining the formation of alkaloids in plants hitherto have been inadequately studied. It has been claimed by some authors that alkaloids are produced in cells most actively when the plants are under conditions which stimulate dissimilation [catabolism] while in other studies it is maintained that the synthesis of alkaloids promotes the assimilative activity of plant cells. The present work is an attempt to elucidate this problem by studying the alkaloid ricinine, which has a simple structure. The effect on the formation of ricinine of shading the leaves of *Ricinus communis* plants was studied first. In this test, 20 plants of uniform growth (100 days) in the flowering stage were divided into two sets of 10. The leaves of the plants in one set were shaded (with the exception of the 4 uppermost leaves) with a light-proof cover ; the second set, unshaded, was used as the control. After 6 days, the leaves and flowers of all plants were analysed for ricinine content (method recorded by Blagoveščenskiĭ in *Doklady Akad. Nauk SSSR* 1952, 82, No. 6. There is evidence that in the shaded leaves the amount of ricinine lessens with decreases in plant dry-weight. It is therefore concluded that a deficiency of assimilates, the enhanced proteolytic processes and inhibited leaf growth result in breakdown of the alkaloid. The upper unshaded leaves and flowers accumulated even a greater quantity of ricinine and showed more intensive growth than the control. This may be due to the stream of products of proteolysis from the lower shaded leaves to the younger leaves and flowers in active growth. The theory that amino-acids may be the raw material in the biosynthesis of alkaloids has been put forward more than once, but as this has not been demonstrated, conclusively, the author made further tests (using infiltration of lysine into *Ricinus* plants) to verify the assumption. The data obtained confirm that the content of ricinine is increased (especially in roots) by infiltration of lysine.—M.H.

675 THOMAS, H. R. **Effects of antibiotics on health and growth of plants.** *Proc. Soil Sci. Soc. Fla* 1953, **13,** 17-25, bibl. 61, illus. [Pl. Industr. Sta., U.S. Dep. Agric., Beltsville, Md]

A review is given of work done on the use of different antibiotics used for seed treatment, for controlling fungus pathogens on plants, as systemic bactericides, and on fungicides as plant growth stimulators.—P.J.B.

676† AMERICAN SOCIETY OF PLANT PHYSIOLOGISTS. **Nomenclature of chemical plant regulators.** *Pl. Physiol.* 1954, **29,** No. 3, 307-8, and No. 4, 400-1.

In the first paper the Majority report by a Committee of the American Society of Plant Physiologists defines such terms as plant regulator, plant hormone, growth regulator, growth hormone, flowering regulator, flowering hormone, auxin, auxin precursor, and anti-auxin. In the second paper the Minority criticizes the use of the word "regulator" and proposes alternative definitions. —D.B.

677 DAVIS, D. **Benzotriazole, a plant-growth regulator.** *Science* 1954, **120,** No. 3128, 989, bibl. 5, illus. [Connecticut Agric. Exp. Sta., New Haven]

A note is given on benzotriazole, which causes morphological changes in tomato plants, characterized by the breaking of apical dominance, reductions in the number of leaflets per leaf, elimination of leaf serrations, leaflet cupping and petiole elongation. This compound is also reported to have the property of breaking the dormancy of potato tubers. Formative effects in tomato plants were produced by root treatments only.—P.J.B.

678† FISCHNICH, O. and others. Anwendung von Maleinsäurehydrazid bei einigen Kulturpflanzen. [**The use of maleic hydrazide on some cultivated plants.**] *Angew. Bot.* 1954, **28,** No. 3/4, 88-113, bibl. 75, illus. [For-

schungsanst. Landw., Braunschweig-Völkenrode, W. Germany]

Results are given of experiments which have been conducted during the past 4 years, and are still in progress, on the treatment of crop and garden plants with the growth inhibitor maleic hydrazide. The experiments fall into three main groups: preservation of tubers and root crops during storage; shifting of the date of flowering; and labour-saving problems. The experiments are not yet sufficiently advanced to make general recommendations, but the following items are noted. Treatment of potato plants before tuber formation resulted in diminished yields of above-ground and underground parts. Treatment after flowering did not reduce yields. The dormancy period was lengthened in potato tubers which were already formed at the time of application of maleic hydrazide. Tubers formed subsequently developed normally. In sugar-beet it was difficult to arrive at optimal conditions of treatment by maleic hydrazide because the effect on yield, sugar content and storage varied from year to year. Treated fodder-beet plants maintained their weight in storage better than did controls. No unfavourable results were observed after feeding treated fodders. The end-date of flowering was delayed in spring-barley, -rye and -wheat but not in oats.—D.B.

679 KENTEN, R. H. **The oxidation of indolyl-3-acetic acid by waxpod bean root sap and peroxidase systems.** *Biochem. J.* 1955, **59,** No. 1, 110-21, bibl. 25, illus.

Possible mechanisms of the reaction are discussed, and evidence is presented suggesting that the oxidation of IAA by the peroxidase systems studied is not dependent on the presence of flavoprotein.—From author's summary.

680 GOLDACRE, P. L. **The photochemical inactivation of indoleacetic acid sensitized by non-protein components of plant tissues.** *Aust. J. biol. Sci.* 1954, **7,** No. 3, 225-50, bibl. 25, illus. [Calif. Inst. Technol.]

681 GALSTON, A. W. and SIEGEL, S. M. **Antiperoxidative action of the cobaltous ion and its consequences for plant growth.** *Science* 1954, **120,** No. 3130, 1070-1, bibl. 8. [Kerckhoff Biol. Lab., Calif. Inst. Technol., Pasadena]

The results are presented of trials, using excised pea roots, which are considered to support the view that the cobaltous ion reduces the production of peroxides and the destruction of indoleacetic acid in plant tissues subjected to high concentrations of O_2. The capacity of Co to reproduce the growth promoting activity of red light in relation to certain types of plant tissue is thought to be due to a similarity between the action of red light and Co on the peroxide metabolism of plant tissues.—P.J.B.

682† BEHR, G. Über die Eigenschaften der Begleitstoffe des Chlorophylls und dessen Bestimmung in frischen Pflanzen. [**The properties of the substances which occur with chlorophyll and their determination in fresh plants.**] *Z. Acker- u. Pflbau* 1954, **98,** No. 3, 325-42, bibl. 7, illus. [Inst. Pflbau, Univ. Göttingen, W. Germany]

The paper begins with a discussion of the properties of chlorophyll, its derivatives and accompanying substances and the possibility of quantitatively determining chlorophyll by means of these substances. Procedures have been worked out to determine chlorophyll from its Mg content and suggestions are given for simplifying the colorimetric determination of chlorophyll by saponification to chlorophyllin. To obtain good comparative values, a method is outlined for the colorimetric determination of the alcoholic extract of the plant material by direct measurement.—D.B.

683† COPPENET, M. and others. Microdosage colorimétrique du cuivre dans les végétaux par la 2-2′ diquinoléine. [**Colorimetric microdetermination of copper in plants by 2-2′ diquinoline.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1954, **5,** No. 4, 597-60, bibl. 8.

684 DEVI, L. S. **Bio-assay of heavy metals by *Aspergillus niger*—sensitivity of a new strain.** *Proc. Indian Acad. Sci. Sect. B* 1954, **40,** No. 1, 1-7, bibl. 10, illus.

The reactions to the presence, in prepared media, of Cu, Mo, Mn, Fe and Zn, of a new strain of *A. niger* (isolated from the rhizosphere of *Cajanus cajan* and designated as M.U.B.L.1) were compared with those of the standard 'M' strain. The new strain was more sensitive to Cu and less sensitive to Mn than the standard strain.—W.J.B.

685† HEALD, W. R. **The growth of plants as it may be influenced by light and manganese.** *Diss. Abstr.* 1954, **14,** No. 9, 1283. [Purdue Univ.]

In view of the known effect of light intensity on the toxicity of manganese to plants, studies were made on the relation between the physiological role of manganese in plants and light intensity. It was concluded that the accumulation of organic acids in plants, which is controlled in part by light intensity, decreases the activity of manganese in plants by forming chelate structures. A reduction in the action of metal ions, particularly those present in trace amounts, is thought to decrease the activity of enzymes requiring these ions for their activation, thus causing a reduction in plant growth.—P.J.B.

586 BERTRAND, G. and SILBERSTEIN, L. Sur la teneur en manganèse des phanérogames. [**The manganese content of phanerogams.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann. agron.* 1954, **5,** No. 3, 317-18, bibl. 6.

This is an introduction to the following paper. [See next abstract.]—D.B.

587† BERTRAND, G. and SILBERSTEIN, L. Nouvelles recherches sur la teneur en manganèse des phanérogames. [**Recent researches on the content of manganese in phanerogams.**] *Ann. Inst. nat. Rech. agron., Paris. Sér. A. Ann agron.* 1954, **5,** No. 3, 319-20, bibl. 2.

The Mn content was determined in entire plants of 389 species belonging to a variety of families. Mn was present in all species analysed, the quantity varying between 10 and 200 mg. Mn per kg. of dry matter. The average Mn content of different families is tabulated and expressed in mg. Mn per kg. dry matter. Examples from the table are : Cruciferae, 43·7 ; Solanaceae, 65 ; Leguminosae, 76·6 ; Gramineae, 77·5. The determinations are considered to be valid for France, England, Italy and Switzerland.—D.B.

588† STALÉ, J. and BOVAY, E. La carence de manganèse chez les végétaux. [**Manganese deficiency in plants.**] *Rev. rom. agric.* 1954, **10,** No. 11, 85-7, bibl. 9, illus. [Sta. Féd. Essais Agric., Lausanne]

This is a general article introducing more detailed papers which will appear later. It briefly describes the symptoms of Mn deficiency in cereal, beet, potato, bean and pea crops, and in red- and white-clover. It is stated that the spraying of leaves [with a solution of manganese sulphate] remedies the deficiency more effectively than applications of this salt direct on the soil.—D.B.

589 BOVAY, E. and STALÉ, J. La carence de manganèse chez les végétaux. [**Manganese deficiency in plants.**] *Rev. rom. Agric.* 1954, **10,** No. 12, 93-5, illus. [Sta. Féd. Essais Agric., Lausanne]

Experiments were conducted on cereals, root crops, and red clover growing in soils in which crops suffered from manganese deficiency. Because this deficiency was caused by the presence of a high proportion of limestone (in a peaty soil) which made Mn unavailable to the plant, direct spraying of a Mn salt on the plant was found to be the only effective method of application. The concentration of the solution was adapted to the crop, e.g., leaves of cereals could stand a solution of 4% $MnSO_4$ and beetroot 3% without suffering from burning, whereas the more delicate leaves of the potato could stand only 0·5% and clover only 0·2%. The following examples of increased yield are given. (1) Oat var. Flämingsgold and wheat var. Huron : a 1% solution of $MnSO_4$ sprayed twice during the plants' growth was especially favourable to grain production and the grain/straw ratio. (2) Potato var. Ackersleben : a 0·2% solution of $MnSO_4$ corresponding to 6 kg./ha. pure substance doubled the yield of tubers, the increase being due to the greater size of the tubers. (3) Red clover : two applications of a 0·2% solution resulted in doubling the yield of dry matter. When applied during the early stages of growth the root system was so much improved that the good effect was reflected in the second cut.—D.B.

690 MULDER, E. G. **Molybdenum in relation to growth of higher plants and microorganisms.** *Plant and Soil* 1954, **5,** No. 4, 368-415, bibl. 50, illus. [Agric. Exp. Sta. and Soil Res. Inst., T.N.O., Groningen, Netherlands]

Studies are reported on the effect of Mo on the growth of a number of crop species, particularly legumes and cauliflowers, grown in pots and in the field, and on the effect of certain soil factors, including soil Mg, Cu and P, on their response to Mo. In pot trials, *Brassica* spp., sugar-beet, potatoes, lucerne and wheat all gave a pronounced response to added Mo when grown on ironstone-containing soils known to produce Mo-deficiency in plants. In field trials with non-leguminous crops, symptoms of Mo-deficiency occurred at an early growth stage and in a severe form. Oats, though showing some signs of Mo-deficiency symptoms, were affected to a slight degree, only, by Mo-deficiency, while barley did not respond to added Mo. Pot trials were carried out, using very acid peat or sandy soils. Cauliflower showed clear signs of Mo-deficiency, while potatoes did not respond to added Mo. The cause of poor uptake of Mo by cauliflowers was considered to be due to the high content of Mn in these soils. Mo-deficiency appeared to be associated with the presence of ironstone, a deficiency of P, high soil acidity, and an excess of Mn and sulphates in the soil.—P.J.B.

691† KLINE, C. H. **Molybdenum opens new markets.** *Agric. Chem.* 1954, **9,** No. 9, 42-5 and 147, illus. [Climax Molybdenum Co., New York, N.Y.]

The use of molybdenum for treating field crops and grasslands in the USA is reviewed. Areas considered most likely to benefit from molybdenum treatment are the acid-soil regions east of the Great Plains and the Pacific Northwest.—P.J.B.

692 LEONARD, C. D. and LUNDBERG, E. C. **Sodium as a plant nutrient.** *Proc. Soil Sci. Soc. Fla* 1951, **11,** 29-47, bibl. 41. [Citrus Exp. Sta., Lake Alfred, Florida] [Received January, 1955]

A review is given of literature on the physiological

and yield responses of different crops to Na and of certain theories put forward to account for the beneficial effect of Na on certain plant species. The results are given of a number of experiments on the application of Na to red beet, celery, spinach and citrus crops.—P.J.B.

693 SCHELTINGA, H. Zinc in grond, plant en dier. Een literatuuroverzicht. [**Zinc in soil, plants and animals. A review of the literature.**] *Landbouwk. Tijdschr., Wageningen* 1954, 836-45, bibl. 29, English summary p. 845.

The literature dealing with the effects of excess and deficiency of zinc in the soil on plants and animals of agricultural importance is reviewed.—W.J.B.

694 VIETS, F. G. and others. **Zinc contents and deficiency symptoms of 26 crops grown on a zinc-deficient soil.** *Soil Sci.* 1954, **78,** No. 4, 305-16, bibl. 9, illus. [Washington Agric. Exp. Sta., Pullman]

In trials in Washington in 1952, 26 different crops were grown, with and without $ZnSO_4$ supplements, on two adjacent areas, one of which had grown maize with symptoms of Zn-deficiency in 1951 and the other of which had produced a normal maize crop. On the basis of the results from these trials, the following crops were tentatively classified as very sensitive to Zn-deficiency : beans, soyabeans, maize and linseed. Crops mildly sensitive were : potatoes, lucerne, grain sorghum, Sudan grass [*Sorghum sudanense*], sugar-beet and red clover. Those not sensitive to Zn-deficiency included : oats, wheat, barley, rye, peas, safflower [*Carthamus tinctorius*] and grasses. Pot trials showed that barley and oats had a greater capacity to absorb native Zn from restricted volumes of soil than beans or soyabeans.—P.J.B.

695† RECKENDORFER, P. Theorie und Praxis der durch Pflanzenschutzmittel verursachten Pflanzenschäden. [**The theory and practice of plant injury caused by plant protection agents.**] *PflSchBer.* 1954, **13,** No. 9/10, 129-53, bibl. 21. [Bundesanstalt für Pflanzenschutz, Wien, Austria]

A biochemical investigation into the cause of corrosion of leaf tissues following the use of insecticides and fungicides was undertaken and was directed more particularly to the disturbance of the ring structure of the chlorophyll molecule. This disturbance was caused by a change in the main and partial valency by which the magnesium atom is bound to the chlorophyll molecule and results in changes in the equilibrium of the assimilation process and the production of toxins. During the investigation, a new method for the micro-determination of zinc was developed.—D.B.

696 LAKON, G. Die Verwendung einer kombinierten Tetrazoliumlösung in der Topographischen Keimprüfung. [**The use of a combined tetrazolium solution in the topographical seed testing method.**] *Saatgutwirtschaft* 1954, **6,** No. 8, 207-8, bibl. 1.

The topographical tetrazolium method of Lakon for determining seed viability can, in certain circumstances, give misleading results owing to the presence of micro-organisms in the material under test. These (as well as living plant tissue) reduce the triphenyltetrazoliumchloride to formazan and therefore also become stained red. By combining a disinfectant, Preventol 115, with the triphenyltetrazoliumchloride the micro-organisms are sterilized without destroying the plant tissues. Details of this modified technique are given.—D.B.

697 ABELL, L. F. De zoutgevoeligheid van zaadteeltgewassen. [**Sensitivity to salt of seed crops.**] *Literatuurlijst 13. Cent. Landbdocument., Wageningen* 1954, bibl. 41.

The literature (chiefly Dutch) on the subject of the salt-tolerance of field, market-garden and herbage crops is reviewed and an up-to-date bibliography on the subject provided. Although the review is written with special emphasis on seed-crops, crops not grown for seed are also considered. The following is a summary of data from literature not previously abstracted in *Fld Crop Abstr.* Turnips can be sown at a C number (number of g. NaCl in 1 l. soil moisture) of 6-8. The crop from oil-seed rape sown at Zevenbergen (by the Institute of Varietal Research, Wageningen) at a C number of 10·3, grew well. Reports on the salt-tolerance of mustard vary : the crop has been successfully grown when sown at a C number of 10.—W.J.B.

698 FRYXELL, P. A. **A procedure of possible value in plant breeding.** *Agron. J.* 1954, **46,** No. 9, 433-4, bibl. 11. [New Mexico Coll. Agric., State College]

A note is given on the possible use of the correlation between high agronomic value and a high capacity on the part of the seeds of particular crop varieties to absorb water from solutions of high osmotic value.—P.J.B.

699† NIJDAM, F. E. **The variety in its diversity.** *Euphytica* 1954, **3,** No. 3, 181-7, Dutch summary p. 187. [Inst. Res. Var. Fld Crops, Wageningen, Neth.]

The definition of the concept " variety " is considered and an attempt is made to define the most important units to which the term " variety " is applied. The botanical definition of variety, varieties of plants with a vegetative mode of reproduction, varieties of autogamous and heterogamous plants, maize hybrids and the conception of the term " variety " in relation to the breeder's

right are discussed. The difference in certain countries, such as France, Britain and the USA, between the botanical and agricultural concepts of the term " variety " are pointed out.—P.J.B.

700 PEDRO, J. G. Contribuições para o inventário florístico de Moçambique. 1. Pteridófitas —Monocotiledóneas. [**Contributions to the flora of Mozambique. 1. Pteridophyta—Monocotyledons.**] *Mem. Trab. 16. Cent. Invest. Cient. Algod. Lourenço Marques, Mozambique* 1954, pp. 47.

MISCELLANEOUS

701† RIGG, T. **Role of science in the development of New Zealand agriculture.** *Presidential address to Aust. and N.Z. Ass. Adv. Sci.* 1954, pp. 35. [Canberra]

702 LAUMONT, P. and ERROUX, J. Remarques sur la technique de l'amélioration des plantes de grande culture suivie au Service de l'Expérimentation Agricole en Algérie. [**Observations on the technique for improving field crops adopted by the Service de l'Expérimentation Agricole in Algeria.**] *Ann. Inst. agric., Algér.* 1953, **7,** No. 9, 1-31, bibl. 13. [Ec. Nat. Agric., Alger.]

The information given includes notes on the technique adopted in trials to study the behaviour of new varieties and in comparative varietal trials. —E.B.O.

703† ZECK, E. H. **The army worm, *Pseudaletia australis.*** *Agric. Gaz. N.S.W.* 1954, **65,** No. 8, 423-4, illus.

The control measures recommended include the use of wet or dry bait, dusts and sprays. BHC, Paris Green or DDT can be used in bran or pollard baits at the rate of 1 lb. DDT per ac., as a dust or a spray, should be used with care to avoid contamination of food crops.—M.P.

704 SHAW, R. H. and others. **The climate of Iowa. 1. The occurrence of freezing temperatures in spring and fall.** *Special Rep. 8. Iowa agric. Exp. Sta.* 1954, pp. 88.

705† O.E.E.C. **Development of the Agricultural Advisory Services in Europe since 1950.** 1954, pp. 97, bibl. 10.

An International Conference on Agricultural Advisory Services, organized by the Netherlands Ministry of Agriculture at the invitation of the Food and Agriculture Committee of OEEC, was held at the Hague in May, 1953. The Conference was attended by delegates and observers from 19 countries and several international organizations. This publication reports 6 papers delivered at the Conference and the recommendations adopted at the final session. [See *Fld Crop Abstr.* 4 : 270.]—E.B.O.

706† MARSDEN, A. W. **Sources of information for the agricultural and food chemist.** *Chem. and Industr.* 1954, No. 37, 1138-41, bibl. 7.

The information services, also the research and trade organizations, in Britain from which information on agricultural and food chemistry may be obtained, are described.—W.J.B.

707 STREEF, G. M. De betekenis van de arbeidsphysiologie voor de landbouw. [**The importance of applied physiology in agriculture.**] *Landbouwk. Tijdschr., Wageningen* 1954, 804-16, bibl. 17, English summary p. 816.

The application of physiology in the study of physical labour in agriculture is discussed. Various types of physical tasks carried out by workers on farms are considered in the light of physiological knowledge.—W.J.B.

708 YARWOOD, C. E. and MIDDLETON, J. T. **Smog injury and rust infection.** *Pl. Physiol.* 1954, **29,** No. 4, 393-5, bibl. 9, illus. [Univ. California, Berkeley and Riverside]

The phenomenon that rust-infected plants were not susceptible to injury by smog was investigated under controlled greenhouse conditions, the test plants being *Phaseolus vulgaris* var. Pinto, which was artificially inoculated with *Uromyces phaseoli*, and *Helianthus annuus* var. Mammoth, which was inoculated with *Puccinia helianthi*. The smog injury was rated on a scale of 0-10. To produce the same amount of smog injury, infected tissues required to be exposed to smog for a much longer period than did healthy tissue. The protection from smog damage by rust infection could not be explained by stomatal closure or by the high content of pantothenic acid in the rust infected tissue, but appears to be due to some substance which diffuses beyond the limits of the rust mycelium.—D.B.

709† KEDING, F. W. Wesen und Merkmale der Internationalen Vorschriften für die Prüfung von Saatgut. [**The substance and special features of the international rules for seed testing.**] *Saatgutwirtschaft* 1954, **6,** No. 10, 257-9. [Samenprüfungsstelle, München, Germany]

A brief account is given of the international rules

for seed testing laid down at the meeting of the International Seed Testing Association in February, 1953, and effective from 1 July, 1954. [See *Herb. Abstr.* 24 : 142.]—D.B.

710† HEALY, M. L. R. **Statistical techniques for inspection sampling.** *Trop. Agric., Trin.* 1955, **32,** No. 1, 10-19, bibl. 8, illus.

Methods of sampling used is seed inspection are discussed.—W.J.B.

711 NYE, P. H. **Fertilizer responses in the Gold Coast in relation to time and method of application.** *Emp. J. exp. Agric.* 1954, **22,** No. 86, 101-11, bibl. 6, illus.

Factorially designed experiments were carried out to determine the most economic and efficient use of N and P fertilizers. The effects of fertilizer treatments on the growth of test crops were studied. Single- and triple-superphosphate and ammonium phosphate, at high and low rates, were equally effective on all crops. For maize and sorghum, application of P at sowing was better than at 20 or 40 days after germination, if broadcast instead of placed. For groundnuts, application of P by any method was equally good whether applied at sowing or 20 days after germination. In trials with mixtures of early- and late-maturing cereals, ammonium sulphate or superphosphate were applied by different methods and at different times. The treatments did not differ significantly in their effects, but the early crop did better if the fertilizer was applied direct to it by broadcasting ; for the late crop broadcasting was the poorest treatment. Responses to small amounts of superphosphate and ammonium sulphate applied in the first year only, were noticeable in crop yields, as compared with the untreated control crops, in the second and third years after treatment. The residual effect of ammonium sulphate on cereals and yams was high in the second year but fell in the third. With superphosphate the residual effect in the second year equalled the direct effect in the first year, on all crops ; on cereals it fell and on groundnuts it rose in the third year.—M.P.

712† BEHRENS, W. U. Das Zusammenwirken der Wachstumsfaktoren. [**The joint effect of growth factors.**] *Z. Acker- u. Pflbau* 1954, **98,** No. 2, 131-44, bibl. 14. [Hannover, W. Germany]

This paper consists of a mathematical treatment of the effect on yield of simultaneously raising the level of several growth factors (in this case fertilizers).—D.B.

713† BOGUSLAWSKI, E. von. Das Zusammenwirken der Wachstumsfaktoren bei der Ertragsbildung. [**The joint working of growth factors in determining yield.**] *Z. Acker- u. Pflbau* 1954, **98,** No. 2, 145-86, bibl. 25, illus. [Justus-Liebig Hochsch., Giessen, Germany]

With the aid of tables and diagrams, cited from literature, the relationship between quantity of fertilizers, climate and yield of field and forage crops is discussed with special reference to the work of Mitscherlich.—D.B.

714 N.A.A.S. QUARTERLY REVIEW. **Soil organic matter : a review of a conference.** *N.A.A.S. Quart. Rev.* 1954, No. 26, 50-63, bibl. 3.

Reviews are given of the following papers read at a conference on soil organic matter, held in the Eastern Counties of Great Britain in May, 1954 : (1) The importance of organic matter to crop plants. By G. W. Cooke and H. V. Garner. (2) Green manuring. By H. H. Mann. (3) Work at Jealott's Hill. By A. E. M. Hood. (4) Experiences with ploughed-in straw. By J. H. Cock. (5) Organic matter in some Eastern Counties' soils. By H. N. Pizer.—P.J.B.

715 HUNTER, J. G. **Nickel toxicity in a Southern Rhodesian soil.** *S. Afr. J. Sci.* 1954, **51,** No. 5, 133-5, bibl. 25, illus.

Oats were grown in soil derived from serpentine rock in Southern Rhodesia. The symptoms produced were noted and the trace-element content of the leaves was determined. Nickel produced toxicity in the oat plants and was present in the leaves in concentrations ranging from 32 to 7·2 ppm., the concentration decreasing with increase in soil depth. Normal oat-leaf dry-matter contains 3 ppm. nickel, or less. Increasing the soil pH by liming is a satisfactory counter-measure, except where the pH is already high.—M.P.

716† DI PRIMA, S. Nuovi procedimenti biometrici sugli schemi sperimentali agro-biologici. [**New biometrical procedures in experimental agrobiological schemes.**] *Suppl. Ann. Sper. agr.* 1954, **8,** No. 6, 25-31, bibl. 5, English summary pp. 30-1. [Sta. Agr. Sper., Bari, Italy]

In the formula $n = Dx^2$, where n is the minimum number of replicates required for reliable statistical results, D is obtained from the data of the investigation, and x is the precision coefficient, the value of n, the unknown term, is found rapidly by means of the given table.—E.B.O.

REPORTS

The notes below indicate the main investigations in the reports covered, in so far as they concern this journal. Where a separate abstract has been made from a particularly interesting section of a report, this is indicated.

717 **Norfolk** Agricultural Station. 46th Annual Report 1953-54. Sprowston, 1954, pp. 15.

INVESTIGATIONS REPORTED :

(1) Residue from sheeping and beet tops, pp. 5-7. A detailed investigation was undertaken to study the effects of the substitution of sugar-beet for mangels and swedes and the possible role of sheep when fed and fattened on beet tops instead of swedes. Preliminary results gave information concerning only the crops grown immediately after treatments. The cumulative effects on the land of ploughing in beet tops or folding either beet tops or swedes were measured at Sprowston, from 1931-50, by the yields of barley, hay and wheat in four 5-course rotations. No farmyard manure was applied to any of the land and in one treatment only a low application of fertilizers was used. Yields were consequently " fair." The results obtained show that hay, wheat and barley yields were highest after the tops had been sheeped or ploughed in. Sheeping of swedes or carting off beet tops resulted in lower yields of all crops, the latter treatment in particular reduced soil fertility. The application of fertilizers increased crop yields, except in one barley rotation. No fertility was built up by any treatment and the effects of sheep and of ploughing in beet tops as green manure were exhausted within 4 years. This was confirmed by soil analyses.

(2) Eyespot in cereals, pp. 8-9. Four different 4-course rotations were tested in which the first and last crop was wheat ; roots, barley, oats or clover being the intervening crops. Results in the last year (1953) showed that a two years' break from cereals was essential in obtaining some control over eyespot (*Cercosporella herpotrichoides*). Where cereals had been grown for 3 or 4 years of the rotation, infection of wheat straws was 80%; but where clover had been grown for two years, infection of wheat straws was 16% only.

(3) Crop variety trials, pp. 10-11. The maincrop potato variety Ulster Supreme outyielded Majestic over a 4-year period by 7%. The sugar-beet variety Battle's Fen gave higher yields of sugar per ac. than Sharpes Klein E, and with 17·9% had the highest sugar content ; it also gave the lowest yield of tops. The K.N.B. non-bolting variety from the Cambridge Plant Breeding Institute had only 0·1% of bolters.—M.P.

718 **Scotland** Department of Agriculture. Report for 1953. Edinburgh, 1954, pp. 91, illus.

Among the subjects of the report are :

1. Production in Scotland, pp. 17-20. The acreage of field crops and fallow was 6800 ac. less than in 1952. The acreage of rotation grass increased by 6441 ac. to 1,485,752 ac. while that of permanent grass fell by 3591 ac. to 1,165,320 ac.
2. Land improvement, pp. 32-4. Progress made in hill-land improvement, drainage, bracken control and the use of fertilizers is reported.
3. Pest control, pp. 37-9. Progress in the eradication of rats and mice is reported. There was an increase in the rabbit population in 1953.—W.J.B.

719 **West of Scotland** Agricultural College. Report on the work of the College for the year ended 30th September, 1953. Glasgow, 1953, pp. 59. [Received April, 1954]

INVESTIGATIONS REPORTED :

1. Crop husbandry, field experiments, pp. 21-2. Varietal trials with oats, wheat, barley and fodder-beet.
2. Weed control, pp. 21-2. Sodium trichloroacetate applied to *Agropyron* in swedes and mangels [amount not stated] did not give complete control and the root crops appeared not to be affected.
3. Bracken research, p. 23. Study is being made of the cost to the farmer of commercial bracken cutting.
4. Root-nodule plants, p. 24. Non-leguminous plants, including *Myrica gale*, are included.—M.H.

720 **France.** Institut National de la Recherche Agronomique. Rapport annuel, 1951. [National Institute for Agricultural Research. Annual Report, 1951.] Paris, 1954, pp. 250, illus.

In this report of the National Institute for Agricultural Research, an account is given of the origin of the Institute by the Act of 1946, its administration and functions. In this Service, agricultural science is divided into eleven divisions : soil science, agricultural bioclimatology, plant physiology, genetics and plant breeding, plant pathology, agricultural zoology, physiology applied to animal husbandry, animal nutrition, animal rearing and genetics, technology of plant products, and technology of animal products. For each division there are a Central Station and regional stations or laboratories. The work is conducted at stations situated at Versailles, Jouy-en-Josas, the South-west Province, Massif-Central, Alsace, the west, south, and south-east. There are several affiliated agricultural colleges. The investigations are reported under their agricultural division, but the work has been conducted at one or more of the many centres.

INVESTIGATIONS REPORTED :
1. Experiments on maize, by M. Godard (Montpellier), pp. 62-3. This work is a contribution to the study of the water requirements of plants and is concerned with the transpiration level under different physical environments, at different stages and with different amounts of foliage. The experiments have a practical bearing on irrigation.
2. Selective weed killers in cereal crops, p. 76. The experiments were designed to test the effect of various weed killers on the sensitivity of winter-wheat varieties, with the result that another variety, Bon Moulins, has been added to the list of sensitive varieties. The severe toxicity of the ethyl ester of 2,4-D to cereals has been confirmed. The sodium salt and amine of 2,4-D are less toxic than the ester. MCPA is even less toxic, and in a pre-emergence experiment with oats, treatment with MCPA resulted in a yield increase of 18%. The factors conditioning this increase are being investigated.—D.B.

721† **France.** Organization for European Economic Co-operation. Seed production, testing and distribution in European countries. *Tech. Assist. Mission. 106. OEEC, Paris* 1954, pp. 183, bibl. in text.
This report was prepared by a Mission of Experts who studied seed production, testing and distribution in 11 member countries of OEEC in the summer of 1952. The countries visited were Austria, Belgium, Denmark, France, Germany, Ireland, Italy, The Netherlands, Norway, Sweden and the United Kingdom. Part 1 of the report summarizes the conclusions of the experts for the whole of the area surveyed, and gives general recommendations. Part 2 gives information on, and recommendations for, each of the countries visited. Tables are given showing data of seed production, distribution and trade in OEEC countries not visited by the Mission (i.e., Greece, Luxemburg, Portugal, Switzerland and Turkey). A table shows the nomenclature of seed categories in use in several countries.—E.B.O.

722 **Netherlands.** Centraal Instituut voor Landbouwkundig Onderzoek. Verslag over 1953. [Report of the Central Institute of Agriculture for 1952.] Wageningen, 1954, pp. 213, English summaries.
INVESTIGATIONS REPORTED :
1. Relationship between pH and weed vegetation on arable sandy soil. By M. Sonnema and H. Mooi, pp. 29-35.
2. Control of late blight (*Phytophthora infestans*) in potatoes grown as a catch crop. By J. C. Bosman, pp. 74-8. [See Abs. 545.]
3. Influence of water-supply and pH on the competition between oats and barley in mixed crops. By W. H. van Dobben, pp. 93-7. [See Abs. 394.]
4. Influence of temperature on length of leaves in winter cereals. By W. H. van Dobben and R. F. Hoogland, pp. 97-101. [See Abs. 384.]
5. Effect of MCPA on flowering and fruit-setting of beans (*Vicia faba*). By P. Riepma Wzn, pp. 110-13. [See Abs. 502.]
6. Sowing-date experiments with maize. By W. R. Becker, pp. 113-17. The following conclusions were reached from experiments in 1952-3 with Goudster, Wisconsin 240 and KFl maize grown for grain : (a) sowing should not take place before 20 April, owing to danger of frost, (b) delay in sowing until after 1 May results in reduced yields.
7. The estimation of the heat requirement of maize. By W. R. Becker and others, pp. 118-24. Attempts to define the accumulated temperature (heat sum), required for the development of maize varieties from sowing to tasselling are described. The minimum growth-temperature (used in the calculation of the heat sum) appeared to vary with variety. The minimum growth-temperature for early-ripening varieties, including Goudster, was 7°C. ; for later-ripening varieties, including Manitoba, 10°C.
8. Effect of insecticides on quality of potatoes. By J. A. Bakhuis, pp. 144-52. Chlordane, Dieldrin, Aldrin, BHC and Lindane all had a detrimental effect on the flavour of potatoes. BHC and Lindane had a more detrimental effect than the other three. —W.J.B.

723 **East Africa.** East African Agriculture and Forestry Research Organisation. Annual Report 1953. Nairobi, [n.d.], pp. 95. [Received May, 1954]
INVESTIGATIONS REPORTED :
1. Rust diseases of maize caused by *Puccinia polysora*. By H. H. Storey and A. K. Ryland, pp. 19-22. Many of the varieties of maize introduced from Central America were found to be resistant to this fungus in the seedling stage. This resistance can be introduced into the local African varieties, which are susceptible.
2. Crop insecticides. By K. S. McKinlay, pp. 30-2. The loss of fruiting points in cotton due to insect damage does not necessarily result in loss of yield unless it occurs over a certain critical short period. Late-season spraying [spray not specified] increases yield, but completely protected plants have not yielded more than unprotected plants, as long as the unprotected cotton has a long growing season and the attack is of not more than medium intensity.
3. Soil microbiology. By J. Meiklejohn, pp. 45-7. Kawanda. Nitrate-accumulation was greater in bare fallow exposed to the sun than in fallow shaded or covered with grass mulch, though the bacteria were less active in the bare fallow. Bush burning, at Muguga, was found to reduce the number of micro-organisms in the top soil, especially fungi

and aerobic nitrogen fixers, and, to a certain extent, nitrifiers. Anaerobic nitrogen fixers, though not killed, were never found to be very effective. There was, however, an increase in nitrogen in the burnt-soil compared with the unburnt. A species of *Beijerinckia*, found in an acid sandy soil, is an active nitrogen fixer and may account for the fertility of such soils.

4. Phosphate and soil fertility studies. By H. F. Birch, pp. 48-9. For millet, a significant relationship has been found between the soil pH and the percentage response to phosphates. The relationship was less significant for sorghum and non-significant for maize.

5. Experimental farm. By H. P. Ledger, pp. 74-6. The barley variety, Research, yielded 12 cwt. per ac. on poor soil, in dry conditions.—M.P.

724 **Southern Rhodesia.** Grasslands Agricultural Research Station, Marandellas. Annual Report for the year ending 30th September, 1953. bibl. 7. [n.d.], pp. 69. [Fed. Minist. Agric.] [Received August, 1954]

INVESTIGATIONS REPORTED :

1. Farming system trial, pp. 8-11. This is still in its early experimental stages and very flexible. The provisional 9-year rotation of the arable blocks consists of 6 years productive ley and 3 years arable cash crops.

2. Fertilizer trials with maize, pp. 13-17. Strong interactions occurred between super- with raw-rock phosphate and sodium nitrate, and between levels of ammonium sulphate and methods of applying super- with raw-rock phosphate. Band applications, instead of broadcasting, appears to have enabled the crop to obtain the extra phosphate needed to balance the high nitrogen dressing. Best yield responses were obtained with phosphate applied in bands at 600 lb. per ac. There were also interactions between levels of ammonium sulphate and levels of super- with raw-rock phosphate. Sodium nitrate applied alone increased dry-matter grain yields, and the addition of phosphate produced a further increase.

3. Soyabean trace-element and fertilizer trials, pp. 18-20. [See Abs. 481.]

4. Summer-wheat trials, p. 33. No. 360 was outstandingly better than other varieties.—M.P.

725 **Madagascar.** Inspection Générale des Services Agricoles. Recherche agronomique de Madagascar. No. 2. Compte rendu 1953. [Agronomic research in Madagascar. No. 2. Report for 1953.] 1954, pp. 144, bibl. in text, illus.

INVESTIGATIONS REPORTED :

1. Analytical techniques applied to foliar diagnosis. By J. Velly, pp. 8-10. [The methods were used with rice and cassava.]

2. A trial of erosion control at Lake Alaotra Agronomic Station in 1952-3. By P. Roche and B. Joliet, pp. 11-16. Cassava is valuable for erosion control. *Dolichos lablab* and *Phaseolus lunatus*, when sown in Nov.-Dec., protect the soil from storms in Jan.-Feb.

3. Botanical terminology of rice. By G. Cours and R. Dufournet, pp. 36-9. The terminology adopted at the Service de la Recherche Agronomique de Madagascar is given.

4. A new rice variety for the west : Vary lava 47 M. By J.-P. Dobelmann, p. 40. Vary lava 47 M, a natural hybrid of Vary lava 28 × Vary lava 16, yields about 30% more than its parents.

5. Rice varietal trials. By R. Dufournet and J. Fritz, pp. 41-5. Trials with selected varieties produced and distributed by the Alaotra Station, i.e., Vary lava 16, Makalioka 34, Makalioka 752 and Makalioka 823, showed the superiority of Makalioka 34 and Makalioka 823, both late. It is concluded that these 2 varieties should replace all the rice populations grown in regions below 1000 m.a.s.l.

6. A trial of density of transplanted rice. By D. Dufournet and R. Rasoavinjoela, pp. 46-52. In 2 years' trials with the varieties Makalioka 823, Makalioka 752 and Vary lava 16 grown at Alaotra on river alluviums of lateritic origin, the highest yields were obtained at the spacings 10 × 10 cm. (= 1 million plants per ha., theoretically) and 12 × 12 cm. (694 thousand plants per ha., theoretically.). The spacing of 12 × 12 cm. with 2 seedlings per stand is recommended.

7. Rice manuring on 2 soil types in Lake Alaotra region. By P. Roche and others, pp. 55-77.

8. Cassava. Foliar diagnosis, mineral deficiencies and manuring. By G. Cours, pp. 78-88.

9. Groundnut investigations at Lake Alaotra Station. By R. Dufournet, pp. 89-103. Trials to find varieties adapted to different groundnut regions in Madagascar indicated the following to be promising : Buitenzorg 214, Valencia 247, Hybrid 33, Hybrid 32, Hybrid 279-73 and Bunch 210. Valencia 247 grown at the spacing of 65 × 15 cm. (102,500 plants per ha.) yielded 1858 kg. of nuts per ha., significantly more than the control Valencia de Diégo.

10. Wheat. By J. Fritz, pp. 114-16. The object of the work at Lake Alaotra Station is to determine the best conditions for growing wheat in Madagascar and to find suitable, rust-resistant varieties. In a variety trial, Ariana and Florence × Aurore yielded best with 2610 and 2570 kg. per ha., respectively.

11. Insects of paddy and rice in storage, a trial with BHC. By P. Goarin, pp. 130-1. Levilite (colloidal silica), at the rate of 2 kg. per metric ton, was more effective than preparations based on γ BHC, the best of which were Novigam and Calandrine G.

12. A trial of chemical weeding of rice. By P. Goarin, pp. 132-4. The effect of Weedone, Chloroxone 8, Herbogil, Weedone + Herbogil and

Chloroxone + Herbogil, applied in one spray treatment, was studied on the following weeds : *Echinochloa colona, Leersia hexandra, Courtoisia cyperoïdes* var. *africana, Pycreus tremulus, Kyllingia exigua, Cyperus articulatus* and *Jussiaea suffruticosa*. Chloroxone + Herbogil gave the highest increase in rice yield from the experimental plots, followed by Chloroxone and Weedone + Herbogil, the increases due to these 3 treatments being significant, compared with the controls. Weedone and Herbogil applied separately did not increase yield significantly—E.B.O.

726 **Belgian Congo.** Institut National pour l'Étude Agronomique du Congo Belge. Rapport annuel pour l'exercice 1953. [Annual report for 1953.] Bruxelles, 1954, pp. 507, bibl., map.

Investigations are reported from various INEAC stations :

1. Cassava. Failures in the germination of cassava seed were found to be caused by fungal attack and the presence of empty seeds. A germination of 85% was obtained after removing the empty seeds by flotation and treating the normal seeds with Ceresan, p. 87. The variety Amer de Six Mois is early and high yielding, p. 369. In the Kivu district, the variety N'Tolili is the most productive and is acceptable to the natives, pp. 418-20. A trial, in which spacings from 0·40 × 1 m. to 0·80 × 2 m. were compared, indicated that the highest root-yield (26,000 kg. per ha.) was obtained from the spacing 0·40 × 1 m. Another trial showed that 15-month-old plants gave the highest yield, pp. 441-2. The variety Sao Pedro Preto yielded 30 tons of roots per ha. after 1 year of growth at Rubona, p. 474.

2. Sweet potato. The variety C.S.K.3 gave the best fodder (foliage) yield, p. 387. In the Kivu district, the variety Virovsky, the most productive, is not acceptable to the natives ; therefore, a mixture of the following varieties will be recommended : 5037, M.46, Caroline Lea and 5237, pp. 416-17. The varieties Nancy Hall, Florida White and American Mameyta are drought-resistant, p. 474.

3. Groundnuts. Rosette disease was controlled by 5 preventive applications of Parathion emulsion, at the rate of 200 g. of active substance per ha., at 10-days' intervals, starting 10 days after sowing, pp. 102-3. At the Gimbi Station, the varieties A.20 and A.65 yielded best when grown on cool lowland soil after a fibre crop (mainly *Urena lobata*), pp. 240-1. Sowing trials at Bambesa Station showed that there was an advantage from sowing early (end of February/beginning of March), a small advantage from sowing deep (8-9 cm.) when conditions of rainfall were unfavourable, and no significant difference between sowing seeds in pods or decorticated seeds, pp. 308-9. In a variety trial, A.65, A.106 and A.92 yielded best, p. 333. Irrigation trial, pp. 372-3. A higher yield was obtained from spacing the seed at 25 × 12·5 cm. than at 25 × 25 cm. The best sowing method is broadcasting 180 kg. seed per ha. and burying it 8 cm. deep with a hoe. Groundnuts grown after tobacco yielded better than after a grass fallow, pp. 461-2.

4. Maize. Studies of mineral nutrition, transpiration, growth and development, pp. 181-92. In variety trials at the Kiyaka Station, the variety Kahila yielded best both on lowland and on sandy plateau soil, p. 356. The distribution of the variety Kisozi was continued in regions above 1900 m.a.s.l. in Ruanda-Urundi, p. 485.

5. Cotton. In a variety trial at Atso, Gar 105-122 yielded best, p. 312. In variety trials at the Boketa Station, Stoneville 2/180 gave the best yield of seed cotton and the highest percentage of ginned fibre, p. 326. At the Mont Hawa Station the varieties Gar 105-162, Fox, Lub. 14-125 and S. 47 yielded best, p. 457.

6. Rice. In variety trials, the varieties R. 75 and R. 10 yielded more than 3 metric tons of dry paddy per ha., p. 334. The varieties R. 68, R. 69, R. 70, R. 4 and R. 5 are highly productive and their grain is of good commercial value, p. 357.

7. Millet (*Pennisetum typhoideum*). The variety Masangu yielded 909 kg. of grain per ha., p. 357.

8. Soyabeans. In a variety trial, in the second growing season, 3 strains of K. 92 and Otootan yielded best, p. 359.

9. In a trial carried out to study the toxicity to *Rhizobium* of fungicides based on mercury, copper or zinc (Ceresan, Granosan, Spergon, etc.), all the fungicides tested were found to affect adversely the inoculation of soyabean seed with *Rhizobium*, pp. 145-6.

10. Potato. At the Nioka Station the variety Yeux Roses yielded best in the first season with 7170 kg. of tubers per ha. ; the variety Arran Chief gave the best yield in the second season with 6500 kg. per ha., p. 443.

11. Beans (*Phaseolus* spp.). The variety Ibundu is recommended for the natives, pp. 417-18. *Ph. coccineus* yielded 1289 kg. of seed per ha., *Ph. angularis* 1200-1500 kg., and *Ph. lunatus* var. Bambesa 3255 kg. in the first season and 671 kg. in the second season, p. 442.

12. *Amaranthus caudatus* var. A. 044 yielded in the second season 1200 kg. of seed per ha., p. 443.

13. *Eleusine* sp. In a variety trial, 0114 yielded 1499 kg. of seed per ha., p. 443. In a cultural trial on fertile soil, *Eleusine* sp. grown after a fallow under Pennisetum lasting 5 years, or grown in the fourth year of cultivation after sorghum/maize/groundnuts, yielded 1250-2107 and 1761 kg. of seed per ha., respectively, pp. 460-1. At the Kisozi Station, the variety Kilga was superior to the local variety, p. 485.

14. Wheat. The distribution of the variety (130)-

1-77 was continued in Ruanda-Urundi. The variety Kisozi (145)-7 proved to be productive and of good quality in trials at Lubero, pp. 484-5.

15. Brewing barley. The varieties Saxonia, Balder, Carlsberg and Haisa II yielded significantly more than the control Aurore, p. 487.

16. Heavy mulching with *Pennisetum purpureum* increased considerably the yields of maize and cotton, while the effect of tillage was uncertain, p. 303.—E.B.O.

BOOKS

727 Wilson, H. K. and Myers, W. M. **Field crop production. Agronomic principles and practices.** 1954, pp. viii + 674, bibl. at end of chaps., illus., New York ; J. B. Lippincott Publ. Co., 23 × 15 cm., 48s.

This book gives an account of the agronomy of field crops in the USA and has been written primarily for use as a text-book by agricultural students there.

The earlier chapters provide basic, background knowledge which the student should assimilate before he proceeds to a consideration of the individual crops. These are then dealt with systematically (but not exhaustively) and an introduction to further reading is provided by selected references at the end of each chapter.

The term field crops is defined, for the purpose of the book, as " those plants most generally produced on a field scale and thus more widely grown than more specialized crops such as vegetables, canning crops or fruits." In such a useful book of this nature, it is to be regretted that the authors' interpretation of their definition has resulted in the student being denied an account of that most important field crop—the potato.—C. L. Skidmore.

728 Geus, J. G. de. **Means of increasing rice production.** 1954, pp. 143, bibl. 103, illus., Geneva, Switzerland ; Centre d'Etude Azote, 28 × 22 cm.

All those engaged in the study or the promulgation of improved methods of growing rice will find interesting information in this book, which is a review of the methods for increasing rice-production that are, or can be, applied in the various rice-growing countries. Rice-growing in all its aspects is treated, but the emphasis is on irrigated rice in Asia and on the use of manures, including green manures. The first half of the book deals with cultural practices in rice-growing, water supply, weed control, the question of transplanting versus broadcasting, the application of chemical fertilizers and the results obtained thereby in the various countries, pre-treatment of seed, seed-bed manuring, plant-breeding as an element in increasing production, pests and diseases and their control. The second half of the book deals with rice growing and the application of improved methods in each of 18 (mostly Asian, but also American, European and Australian) important rice-growing areas. The reports on the results obtained with fertilizers on the various soil types found in each area are especially valuable. There is a valuable bibliography, chiefly of recent work. On page 20 it is said of mentek disease of rice that " this disease appears 3 to 5 weeks after transplanting and farmers suppress it by trampling the soil" and on page 49 that " Dr. Kuilman's investigations showed that the type of root system possessed by the plant is the predisposing factor in the disease." This seems a somewhat summary dismissal of a disease whose causes (far from fully understood) are still the object of intensive study in Indonesia.—W. J. Baulkwill.

729 Jacks, G. V. and Milne, M. Kathleen. **An annotated bibliography of rice soils and fertilizers.** 1954, pp. v + 180, Harpenden ; Commonw. Bur. Soil Sci., and Rome ; FAO, 23 × 16 cm., $1·50 or 7s. 6d.

In addition to the bibliography on rice soils and fertilizers referred to in the title, there is a section (pp. 39-86) devoted to references to rice cultivations, rotations, mechanization, drainage and irrigation. It is explained in the preface that 1929 should be regarded as the starting date of the bibliography ; only a few earlier references are included.—C. L. Skidmore.

730† Hartwig, H. B. **Legume culture and picture identification, seedling to maturity.** 1953, pp. 42, illus., New York ; Marion Hartwig, 109 Worth Street, Ithaca, N.Y., 21 × 28 cm., $1·00.

This publication is primarily intended for use by farmers, for whom it provides a concise, detailed guide to the identification of 30 species of legumes. Practical information is given on the cultivation and agronomic characteristics of the different species.—P. J. Boyle.

731 Knight, R. L. **Abstract bibliography of cotton breeding and genetics, 1900-1950.** *Tech. Commun. 17. Commw. Bur. Pl. Breed. Genet.* 1954, pp. 256, Farnham Royal ; Commonw. Agric. Bur., 23·5 × 16 cm., 21s.

During many years of work on breeding cotton, Dr. Knight has made a collection of bibliographical material which is probably unique in its scope and completeness. It embraces half-a-century's literature on one of the plants in which the application of

genetic principles has made the most notable contribution to practical improvement. In compiling the bibliography an attempt has been made to include every major scientific paper on the subject published between 1900 and 1950, and to summarize its contents. The work thus comprises a unique source of compressed knowledge which will be of interest, not only to specialists on the subject, but to teachers and students and indeed any reader interested in the development of genetical science and its application to the solution of a concrete set of problems in practical agriculture. Over 1000 scientific papers are summarized in the Bibliography and a number of others are mentioned by title. Appendixes give a complete list of the genes so far found in the genus *Gossypium*, the identity of the genomes and the linkage groups.

732 TEIXEIRA, A. J. da S. and TEIXEIRA, R. de C. A. da S. Glossário do Algodão. (Ingl-Port., Port.-Ingl.) [**Glossary of cotton. (English-Portuguese and Portuguese-English.)**] *Mem. e Trab. 7. Cent. Invest. Cient. Algod.* 1953, pp. 148, bibl. 24, illus. [Received Nov., 1954]

The vocabularies of the botany, breeding, cultivation and processing of cotton are treated exhaustively. Since both the botany and agronomy of cotton have much in common with the same aspects of other cultivated plants, the glossary will be of great value not only to cotton specialists but also to botanists and agriculturists interested in translating from the one language to the other.—W. J. Baulkwill.

733 ROSE, G. J. **Crop protection.** 1955, pp. xxi + 223, illus., London ; Leonard Hill, Ltd., 24 × 15 cm., 30s.

The control of crop pests, diseases and weeds is here examined and discussed in such a way that the practical grower can readily grasp the various issues involved in the selection of particular forms and formulations of chemicals for specific crop protection problems.

The salient qualities of some of the more widely used herbicides, insecticides and fungicides are described and their efficacy for particular purposes and conditions indicated. Where they have been tried successfully in practice, and quoted in the text, their rates of application for the control of specific pests, diseases and weeds have been tabulated in a summary arranged by crops.

The last part of the book is devoted to an exposition of the principles, advantages and disadvantages of the wide range of equipment now available for applying crop-protection chemicals. This section is well illustrated by photographs and line drawings and is concluded by a chapter on the choice, operation and maintenance of dusting- and spraying-machinery.—C. L. Skidmore.

734 ZONDERWIJK, P. Mededeling No. 111. Onkruidbestrijding met chemische middelen. 2e herziene, veranderde uitgave. [**Information booklet No. 111. Control of weeds by chemical means. Second, revised edition.**] 1954, pp. 91, illus., Wageningen ; Plantenziekenkundige Dienst, 24 × 17 cm., f. 1·85.

The control, by chemical means, of weeds in arable crops and grassland is described. There is a descriptive account of non-selective (including CMU) and selective herbicides. In the case of arable crops, the suitability of various chemicals for use on the different crops grown in the Netherlands is discussed. There is an index of crops, weeds and chemicals.—W. J. Baulkwill.

735 SIMMONS, N. O. **Compound milling and associated subjects.** 1955, pp. xix + 279, illus., London ; Leonard Hill, Ltd., 25 × 16 cm., 42s.

Compound milling provides an up-to-date account of the different processes and machinery used in the manufacture of compound feeding stuffs for livestock. The work is well illustrated both by photographs and diagrams (but, in the review copy received, Figs. 36, 40, 42 and 43 were inserted upside down and in the wrong order).

Chapter 7 is devoted to seed-cleaning processes and includes accounts of : oat clipping, seed separation by size, length, width, surface irregularities and colour, and the dressing of seed with fungicidal powders.—C. L. Skidmore.

†736 FEATHERLY, H. I. **Taxonomic terminology of the higher plants.** 1954, pp. 176, bibl. 23, Ames, Iowa ; Iowa State College Press, 19·5 × 12·5 cm., 30s. [Received Jan., 1955]

The author has provided a concise source of information on terminology in the fields of taxonomy and plant distribution in a conveniently sized publication. The largest section is the glossary of botanical terms ; this is supplemented by a subject classification of the terms. To make these terms intelligible to those who have not studied Greek and Latin a further section gives examples, arranged alphabetically, of Greek and Latin components of technical words, their meaning and use. Finally, there is an odd assortment of information in an appendix which consists of a list of laws, theories and hypotheses, and notes on floral evolution and on phyllotaxy. The book is comprehensive, but intentionally not exhaustive. The author states that he has omitted obsolete and seldom-used words. However, some omissions which are not obsolete terms in the field of taxonomy and plant distribution occur to the reviewer. For example, Ecotype is absent from the terms classified under Type Terminology, though Agrotype is present. Again, is "adaptation" an obsolete or seldom-used word in the field of plant

distribution ? Among the laws and hypotheses we find Leibig's law of the Minimum but not the law of Mitscherlich.—D. Brown.

737 GARRAD, G. H. **County Agricultural Surveys No. 1. A survey of the agriculture of Kent.** 1954, pp. 232, bibl. 140, illus., London ; Roy. Agric. Soc. England, 25 × 18 cm., 21s. [Received Jan., 1955]

This admirable work is No. 1 of a new series of County Agricultural Surveys to be published by the Royal Agricultural Society of England. The surveys will be similar in many respects to those prepared over a century ago (and still of value) by the Board of Agriculture of those days.

The survey gives a synopsis of Kentish agriculture to-day, reviews past achievements and indicates some future lines of improvement. It is very appropriate that this survey, written in 1950, should appear now as it will form a permanent record of the agriculture in the County as it is at the end of a fifty-year period of unprecedented development.

The volume opens with general information on size of holdings, rents, water and electricity supplies, labour and geology. This is followed by descriptions of farming on the following types of land : the high weald, weald clay, the lower greensand, gault clay, chalk, Thanet beds, London clay, coastal marshes, North-West Kent, the Hoo Peninsula, Sheppey, Thanet and Romney Marsh.

The remaining chapters of the survey deal with : the grasslands of Kent, hops, fruit, implements and machinery, livestock, markets, agricultural education and research, agricultural organizations, woodlands and forests.

The survey is well illustrated with photos, supplemented by maps, graphs, numerous tables and a bibliography of 140 items. It is well printed and is bound in a cover worthy of the whole. Dry statistics and interesting reading have been cleverly combined by the author whose vast knowledge of the County is based on over forty years' work there, principally as agricultural adviser and organiser.—A. G. G. Hill.

738 RUSSELL, J. **World population and world food supplies.** 1954, pp. 514, illus., London; George Allen and Unwin, 24 × 15 cm., 50s.

Three times since the beginning of the nineteenth century—in the days of Malthus, of Sir William Crookes and of Lord Boyd Orr—the fear of world hunger has spread, bringing especial anxiety to Britain. The most recent anxieties have been intensified by a number of factors whose significance it is difficult to assess, for example, the threat of soil deterioration, and the dislocation which is liable to follow abrupt efforts to further national aspirations for independence. The scarcity of reliable statistics showing trends in food supplies and population over large areas of the world has added to the difficulties.

It is against this background that Sir John Russell has prepared a comprehensive factual study of the food and agricultural situation in those countries which are most important from the point of view of food production and consumption. He has then reviewed the development of the present agricultural system and shows what each country is doing to increase food production.

He opens with a general review of the world problem and closes with a review of prevailing trends. In the body of the study he reviews the United Kingdom, Eire and the intensive producers of northwest Europe. Chapters follow on the peasant producers of Europe, on Africa—both its European and peasant farming—the problems of a growing population in India and Pakistan and of the rice economy of much of the rest of Asia. The final chapters deal with the exporting countries of North America and Australia, New Zealand and the great potential supplier in South America.

For each country there are numerous statistics on land use, livestock populations, food production and utilization, and on physical factors affecting agricultural production. After describing the main features of the agricultural systems, the "growing points"—the new varieties of crops whose use is spreading and the new techniques of production—are given special attention.

The fundamental importance of pastures and fodder crops and of the contribution of developments in this field is stressed in many countries. So are some of the great unsatisfied needs, for example, a leguminous crop for semi-arid land and some of the numerous African wild grasses which will set seed reasonably freely under farm conditions. Since a stable agriculture in many regions seems improbable unless livestock can be closely integrated with the farming system, more and better fodder is of prime importance. This is reflected in numerous references to selection, management and conservation of pasture and forage crops.—K. E. Hunt.

739† ENGLAND AND WALES. Ministry of Agriculture and Fisheries. **The farm as a business.** 1954, pp. 107, bibl, 43, illus., London; H.M. Stationery Office, 21 × 16 cm., 4s.

This is a handbook of standards and statistics for use in farm management advisory work. In recent years the increasing volume and variety of the resources used in farming has resulted in the business side of farming becoming more complex. Every farmer wishes to build up a well-balanced and profitable farm unit ; he also wants to know what returns he may expect from the introduction of new farming methods. To promote the study and application of modern methods of farm management, the Ministry of Agriculture and Fisheries has

prepared this handbook, thought to be the first of its kind, in which an attempt has been made to set out a rational approach to management problems and to give statistical and other data to assist in their solution.

740† MITSCHERLICH, E. A. Bodenkunde für Landwirte, Forstwirte und Gärtner, in pflanzenphysiologischer Ausrichtung und Auswertung. [**Soil science for farmers, foresters and horticulturists, on a plant physiological basis.**] 1954, pp. 335, illus. 40, Berlin-West ; Paul Parey, 24 × 16 cm., 27DM.

741 CONNELL, V. **The application of results of research.** 1954, pp. 207, London ; Butterworth's Sci. Publ., 22 × 14 cm., 21s.

This book reviews the methods adopted by the Commonwealth countries and was first presented as a Report to the British Commonwealth Scientific Conference held in Australia in 1952. The Conference considered that the material it contained was of such importance that it should be brought up to date with a view to publication. Conclusions : as regards the application of the results of research in agriculture, Committee 3B [agriculture] confined itself to a statement of broad principles. These are (i) There should be a close association between research workers and extension officers, and there should also be contact at a higher level between those responsible for determining general agricultural policy. (ii) Effective extension work, being for the benefit of farmers, is best carried out on a basis providing for the maximum practicable degree of decentralization. (iii) Extension officers must be as capable and as well trained scientifically as research workers and should enjoy a comparable status. They must be able to size up practical agricultural problems and to see opportunities for the application of modern knowledge to them : extension officers must, therefore, be given ample opportunity of keeping abreast of scientific progress by the provision of refresher courses and of literature such as Commonwealth Agricultural Bureaux abstracts. (iv) Prompt publication of results in forms suitable for extension officers and primary producers is vital. (v) A research organization should maintain interest in the problems that it has investigated until the solutions advanced are actually adopted by farmers ; care must be taken that the prime task of research officers, namely, the conduct of research, is not thereby prejudiced. (vi) Extension work, to be successful, requires the co-operation of the more progressive farmers and of farmers' organizations, and it is essential that they take part in the dissemination of knowledge. The Committee was impressed by the value of surveys in defining problems and in aiding the effective application of the results of research. In some countries these have been carried out very effectively by farmers' organizations.

742 NORMAN, A. G. (Ed.) **Advances in agronomy. Vol. 6.** 1954, pp. xi + 383, bibl., illus., New York ; Academic Press Inc., 23 × 14 cm.

Among papers contributed to this volume are :

1. Requirement and availability of soil water. By O. J. Kelley, pp. 67-94.
2. New concepts of management of corn-belt soils. By S. W. Melsted, pp. 121-42.
3. Seed-flax [linseed] improvement. By J. O. Culbertson and others, pp. 143-82.
4. Technological aspects of trace element usage. By A. A. Nikitin, pp. 183-97.
5. Crop adaptation and climate. By C. P. Wilsie and R. H. Shaw, pp. 199-252.
6. Potassium in plant nutrition. By K. Lawton and R. L. Cook, pp. 253-303.
7. Sorghum improvement. By J. R. Quinby and J. H. Martin, pp. 305-59.—P.J.B.

743† STEVENS, N. E. and STEVENS, R. B. **Disease in plants. An introduction to agricultural phytopathology.** 1952, pp. xix + 219, bibl. at end of each chap., illus., Waltham, Mass; Chronica Botanica Co., 23 × 16 cm., $4·75. [Received December, 1954]

NOTICE

INTERNATIONAL COMMITTEE OF AGRICULTURAL LIBRARIANS AND DOCUMENTALISTS

At a meeting in Frankfurt, March, 1955, attended by agricultural librarians from 7 countries and F.A.O., preliminary arrangements were made for the formation of this Committee, with the purpose of reviving and extending the work of the pre-war Comité International des Bibliothécaires Agricoles. Plans were made for the holding of an International Congress of Agricultural Librarians and Documentalists on 10 and 11 September, 1955, probably at the Rijksland-bouwhogeschool at Ghent, at which the formal constitution of the Committee is to be followed by papers and discussion. Anyone interested in making contact with the Committee is invited to write to one of the following addresses : Dr. S. v. Frauendorfer, Hochschule für Bodenkultur, Vienna 18/110, Austria ; Mr. Th. P. Loosjes, Centrum voor Landbouwdocumentatie, Rijksstraatweg 1A, Wageningen, Netherlands ; Mr. D. H. Boalch, Rothamsted Experimental Station, Harpenden, Herts, England.

NEWS ITEMS AND NOTES

Great Britain

744 AGRICULTURAL RESEARCH AT SITTINGBOURNE, KENT. All the agricultural research work carried out by the Shell Group in their laboratories at Amsterdam and Thornton, Cheshire is to be transferred to the Shell Agricultural Research Centre at Woodstock Farm, near Sittingbourne, where extensions to the present buildings are taking place. Laboratory space will be increased from 4000 to 21,000 sq. ft. The present staff of 32 will be increased to 100. *Agriculture, Lond.* January, 1955.—W.J.B.

Belgium

745 SEED EXCHANGE. The Botanic Garden of Brussels offers seed of the year 1954 in exchange. The list includes many species of Gramineae, Leguminosae, Chenopodiaceae, Cruciferae and Solanaceae. Particulars of the seed available may be obtained from this Bureau or from the supplement to Vol. 24 of the *Bull. Jard. bot., Brux.*—D.B.

Germany

746 GERMAN SOIL SCIENCE SOCIETY. At the Meeting of this Society in Bonn, in autumn 1953, several papers which centred round Mitscherlich's law expressing the operation of growth factors are reproduced in honour of Mitscherlich's 80th birthday in *Z. Pfl Ernähr. Düng* 1954, 56, No. 2. E. A. Mitscherlich opened the series of papers by explaining the law in its present-day form. Other papers read were: research into the action of nitrogen on plant yield based on the law (N. Atanasiu); the methods used in investigations, e.g. evaluation of the law (E. A. Mitscherlich); towards a knowledge of the "b" value (E. von Boguslawski); pot and field-manuring trials, their comparability on the basis of the law, (N. Atanasiu); and the problem of defining the law (B. Baule). A discussion followed.—D.B.

Austria

747 HERBICIDE DEMONSTRATION. The organization behind the large-scale and successful demonstration of weed control in cereal fields and grasslands with Austrian hormone preparations, using spraying tractors, is described. This was a combined effort of a chemical firm, the Department of Agriculture, agricultural schools, the press, radio and mobile speakers. *Landw. Pr.-Umsch.* [October/November, 1954.—D.B.

748 COLORADO BEETLE CONTROL. More than one-fifth of the entire potato-growing area in Austria was attacked by Colorado beetle in 1954. Control was possible with the usual insecticides when applied at the correct rates. The cost was 6 million Austrian shillings. *Pfl Sch Ber.* January, 1955.—D.B.

South Africa

749† SEED TESTING STATION, PRETORIA. The South African Department of Agriculture has announced that the analysis, testing and examination of seed, except forest-tree seeds, will be undertaken by this station. The minimum weights for seed samples sent for analysis are: 1000g. large-seeded bean varieties; 500g. beans, peas, cereals, etc.; 500g. for the examination for the presence of noxious weed seeds; 500g. for the examination of clean seed content; 200g. for beet seed etc., 50g. grasses etc . . . The seed samples should be sent to: Seed Testing Station, P.O. Box 994, Pretoria. *Fmr's Wkly, Bloemfontein* 22 December, 1954.—M.P.

750† A CLIMATOLOGICAL ATLAS OF AFRICA is being compiled by a special Climatological Unit established in the University of Witwatersrand, Johannesburg, under the direction of Dr. S. P. Jackson. The compilation of the Atlas was first proposed in 1949 by Dr. T. E. W. Schumann at the African Regional Scientific Conference. The proposal was resubmitted in 1953 at the first session of the African Regional Association of the World Meteorological Organization. Such an Atlas is essential for the study of problems such as: food production and agriculture, the control of diseases of men and animals, land settlement, the assessment of the strategic resources of the Continent. It is expected that the Atlas will be completed in 3 years at a cost of about £20,000. Recommendations have since been made at a meeting of the World Commission for Climatology that a Climatic Atlas of the World should be produced. *S. Afr. J. Sci.* November, 1954.—M.P.

Australia

751† SEED EXCHANGE. A 1954 list of the seeds of 1000 species and varieties of grasses, legumes and miscellaneous plants has been published by the Plant Introduction Section of the C.S.I.R.O., Division of Plant Industry, P.O. Box 109, Canberra.—M.P.

South America

752 SYMPOSIUM ON THE THREE GUIANAS. A symposium on agricultural and forestry problems in British Guiana, French Guiana and Surinam (Dutch Guiana) was held in June, 1954 under the auspices of the Royal Tropical Institute, Amsterdam. The meeting was attended by experts from Britain, France and the Netherlands. It was agreed that an expansion of agriculture in the Guianas is necessary and it was proposed to make a joint study in the Guianas of the possibilities of the medium-sized farm in both coastal and inland areas. It was recommended that a detailed study of the drainage and irrigation of parts of the coastal region and an investigation into the agricultural possibilities of the interior should be made. *Neth. J. agric. Sci.* November, 1954.—W.J.B.